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The Railway Bill.

THE preface of this measure states that it is identical with the Bill which passed through the House of Lords last session, except that the "conciliation" clause, which had been struck out, has been restored. On perusing the new Bill, however, it at once becomes apparent that it differs from last year's measure as originally drafted, inasmuch as it occupies three more pages, and contains several more clauses. This, of course, is owing to the various amendments adopted during its passage through the different stages in the Upper House last session; and it may be as well to briefly indicate its prominent features as now before the House, and to note the alterations which have been effected since we reviewed Lord Stanley's Bill a year ago.*

At the outset, the constitution of the new Railway Commission is different. As the proposal now stands, there are to be two appointed, and three *ex-officio* Commissioners, one of the former to be experienced in railway business. The *ex-officio* Commissioners are to be Judges of Superior Courts for England, Scotland, and Ireland respectively, one of whom is to attend and preside at the hearing of any case, when his opinion upon questions of law is to prevail. The jurisdiction conferred upon the Court includes power of hearing all toll and rate disputes, rating appeals, &c., these matters and the *locus standi* clauses standing as before.

The decision of the Commission is to be final upon questions of fact and as regards the *locus standi* of complainants, but appeal to Superior Courts is allowed upon questions of law. It is, perhaps, inevitable that appeal should be allowed. However carefully a measure may be prepared, cases are certain to arise in which the interpretation or application of a clause is uncertain; and, while strongly deprecating unnecessary appeal, we cannot but recognise the danger of absolutely prohibiting it. One of the Railway Commissioners (Mr. Price) has used these words:—"I confess for myself that I am oftentimes compelled to construe particular sections of Acts of Parliament with great difficulty and doubt. Acts of Parliament affecting Railway Companies are very often badly drawn, and it is not easy to understand their meaning, and therefore I should be sorry to have it supposed that a decision arrived at in a case of this kind is always free from doubt." When we say that it is advisable to be prepared for the possibility of this measure being misconstrued on some future occasion, we do not think that the remark will be taken as reflecting upon our legislators; but experience shows that contingencies may arise in which a limited right of appeal is desirable. The strong objection entertained by many to such a provision is founded upon that abuse of the privilege for which railway companies are notorious, and it is essential that the interests of less powerful litigants should be carefully safe-guarded. A case was decided by the House of Lords only a week ago, in which a railway company were the defendants, which had been heard no less than four times, the cause of action having occurred more than three years ago. The result was that the original verdict of the County Court judge against the railway company was confirmed, Lord Bramwell alone dissenting from this decision. It is especially important that there should be no loophole for appeal upon questions of fact. Lords Bramwell and Grimthorpe were signally defeated in their attempts in this direction last year; but it is, of course, possible that these attempts may be renewed.

The rates and charges clauses are now pretty familiar, and the railway companies have had so many intimations that they will be required to submit revised classifications and schedules of maximum rates to the Board of Trade, that these are doubtless quite ready, or in an advanced state of preparation. At the Great Northern half-yearly meeting the Chairman said he should be very glad if the Bill, as it now stands, were to become law. This proves that the railway companies are getting reconciled to Lord Stanley's proposals, the secret of which may be found in the wide definition of the "terminals," for which they are thereby authorised to charge, combined with the qualified nature of the prohibition of preferential rates. On both these counts the trading community most naturally object to the Bill. First, as to terminals. We explained last year that as the law at present stands the only additional charges the railway companies are entitled to make beyond those for conveyance are for the various services expressed by the phrase "handling terminals"; while the present measure would give them power to charge for stations, sidings, and other accommodation of a similar nature. It will be readily perceived that the latter comes under a different category altogether, and it is just this power for which the railway companies have been, with varying success, for years contending. Without going further into this question (which largely depends upon the construction to be put upon the old Acts), it may be noted that the following important proviso finds place in the present measure which was not in the original draft last year. "In the determination of the terminal charges of any railway company regard shall be had only to the expenditure reasonably necessary to provide the accommodation in respect of which such charges are made, irrespective of the outlay which may have been actually incurred in providing that accommodation."

Our views upon the subject of preferential rates are well known, and it is only necessary to briefly indicate the provisions of the clause as it now stands. The railway companies are required to prove, in the event of it being shown that they charge one party less than another for the same or similar services, that such difference in treatment does not amount to an undue preference. The reservation which is contained in the last section of this clause, and which has excited such determined opposition on the part of the agricultural and other interests, is much more carefully worded than in any previous measure, and now reads as follows:—"In deciding whether a lower charge or difference of treatment does or does not amount to an undue preference, the Commissioners may, so far as they think reasonable, in addition to any other considerations affecting the case, take into consideration whether such lower charge or difference of treatment is necessary for the purpose of securing in the interests of the public, the traffic in respect of which it is made. Provided the Commissioners shall have power to direct that no higher charge shall be made to any person for services in respect of merchandise carried over a less distance than is made to another person for similar services in respect of the same description and quantity of merchandise carried over a greater distance on the same line of railway." We take it that what is really required to meet the demands of the case is, that the Act itself should make the provision contained in this last sentence an absolute and binding rule upon the companies, and that it should not be left to the discretion of the Commissioners, or remain in any way an open question. The sentence was introduced last year after the second reading, and a new clause has also been

* *Builder*, March 12, 1887.

added relating to undue preference to goods carried by sea in vessels owned by railway companies.

Mr. Oakley, of the Great Northern Railway, speaking at the dinner held by the Associated Chambers of Commerce last week, attempted a defence of preferential rates, which was anything but convincing. It was, in fact, a repetition of what he advanced when the railway companies introduced their Bills in 1885. In a letter to the *Times*, published on January 31st, 1885, Mr. Oakley said, "exceptional rates for export and import traffic have been quoted at the instance of traders or to meet the demands of competing ports, and not on the independent motion of the railway companies, who can have no possible motive or desire to maintain rates which tend in any degree to injure British commerce." Precisely the same argument was used last week, when the statement that the aim of the railway companies was to give all the ports a fair chance of trade was received with some amount of incredulity. Mr. Oakley proceeded, however, to state that the companies were aware that their interests lay in the satisfaction of their customers, and promised that the assistance of commercial men in settling the difficulty would be cordially welcomed.

The clauses relating to the publication of rates have been amplified, and direct that the public shall have free access to the classification, &c., and also be furnished, on application, with the details of the composition of the various rates in force. The provisions of these sections are fuller and more definite than those struck out at the instance of Lord Brabourne last year.

Lord Stanley is evidently anxious for the "conciliation" scheme to be tried,—or, at all events, further discussed. It was abandoned last year on the motion of the Marquis of Tweeddale, who argued that although arbitration of this nature was successful in other countries, this was due to the absence in those countries of a tribunal corresponding to our Railway Commission. The proposal is for the Board of Trade to be empowered to act as mediator, and to endeavour to compose differences between the railway companies and the public. There can scarcely be any serious objection to such a plan, especially as provision is also made for reports of such proceedings to be submitted to Parliament, when the publicity given to them could hardly fail to be instructive and useful. If the work of the Commissioners should thereby be lessened such a result could not be regarded as a misfortune, as arbitration is far preferable to litigation. Certainly, the late Mr. Grierson pronounced the scheme impracticable, but there can be no harm in giving it a trial.

There are now ten clauses relating to canals, as compared with six last year. The returns demanded by the Board of Trade are not so elaborately set forth as before, probably because it was found to be impracticable for some of the canal companies to comply with all the requisitions of last year's Bill. The returns are now to be "such as the Board of Trade may require for the purpose of showing the capacity of such canal for traffic." But the principal clauses of this part of the Bill are those debarring railway companies or their officers from acquiring canal property without express statutory authority, and in this respect the terms of the measure are precisely the same as before. A new clause appears extending to canals the Abandonment of Railways Act, and enabling the Board of Trade to arrange for the future management of such a canal if they consider that it should be transferred to any other body. The intention is, of course, to ensure the utilisation of the waterways of the country wherever it can be shown that they are capable of being worked to the advantage of the community. The remaining clauses call for no comment, all the "definitions of terms" and other miscellaneous regulations being unaltered.

This, then, is the form in which the railway rates question comes before Parliament this Session, the Bill being down for the second reading in the House of Lords the latter end of his week. This, like every other grievance, has been greatly exaggerated, and much undeserved obloquy has been cast upon the railway managers by persons unable to appreciate the difficulties of their position. The shareholders also come in for their share of abuse, the following quotation from an article recently published on this question being a specimen of the extravagant utterances which too often take the place of dispassionate and reasonable argument:—"One would almost be inclined to doubt that the shareholders are Englishmen; they seem to act like the interested agents of foreign competing countries. How long are these shareholders, mainly composed of sharks, wire-pullers, and speculators, to have the power to hinder the advent of prosperity? That is what it comes to, therefore they should not be treated with any tenderness. The time for parleying has passed. The motto should now be 'No quarter'! Their teeth must be drawn, or, at any rate, they must be prevented from inflicting further injury on their compatriots." This is a wholesale condemnation of a rather large section of the community, and can hardly be expected to be productive of good. The issues are now pretty clear, and Mr. Oakley, in the course of the speech to which we have before alluded, said that the railway companies were quite as anxious to come to an agreement as the traders, and that if they failed they would be prepared with a straightforward and manly reason why.

NOTES.

A NOTE of warning as to the possible condition of the Thames next summer was sounded by Mr. Runtz at the meeting of the Metropolitan Board of Works on the 24th ult. He moved that advertisements be at once issued inviting tenders for the supply of 2,000 tons of permanganate of soda to be delivered at the rate of 100 tons a week from the first week in May. The motion was shelved for a week or two, but, as justifying his action, Mr. Runtz said that everything so far pointed to the likelihood of the river becoming offensively foul as soon as the warm weather set in, unless the Board were prepared to take precautions betimes. According to the Registrar-General's returns, the rainfall during 1887 was only 18·8 in. as compared with an average of 27 in. per annum. At the present time there was coming over Teddington weir very little more than half the normal flow of water from the Upper Thames, and for the last three months the state of the river had been worse than it usually was during the winter. Sir Henry Roscoe, he said, was of opinion that whenever the oxygen in the water of the river was reduced to 20 per cent. of the possible amount, then deodorisation ought to begin. Mr. Runtz said he believed that limit had been passed already, and that only the prevailing low temperature prevented the offensiveness of the river at the present time from becoming disagreeably apparent. It was incidentally stated that Sir Henry Roscoe's report to the Board on the deodorisation of the sewage at the outfalls, and on the state of the river, a document about which, as we have before pointed out, the Board has been so reticent, not to say mysterious (mainly, we believe, because the Board in its wisdom considers that Sir Henry Roscoe has "exceeded his instructions" by telling them some unpalatable truths), is at length in the hands of the members, and is "under consideration." We ask again, why cannot a report of so much importance to the metropolis be made public, in order that engineering and chemical experts outside the Board may consider it? The suppression for so many months of a report of this moment, by an acknowledged authority, does not redound to the credit of the Board.

UNDER the head of "Question des Honoraires," M. Bartaumieux, in the last number of *L'Architecture*, supports the principle that the architect, like the painter, sculptor, and musician, cannot settle the value of his works by tariff, and that he ought to be at full liberty to place his own value on them, according to the time and trouble employed, and the place and circumstances of the work, &c. The writer also propounds the view that the architect's work cannot be judged of or priced as long as it is merely "à l'état de projet"; that only when the work has been completed, under the care and direction of the architect, can the precise value of his professional services be reckoned. He puts it that the architect is in this respect on the same footing with a doctor, who sends in his account at the end of a case in proportion to the amount of his time and attention which it has called for. This parallel will hardly hold good, because the disease is not under the control of human agency in the same way that the progress of a building is. It would be a somewhat parallel case if the client went on increasing the extent and development of his building during its progress, and then wished to pay the architect no more than he would have charged for the originally-intended building; but then this case would be provided for by the system of percentage fee on outlay, which is exactly the system that M. Bartaumieux is decrying. We should hardly think that a system by which the architect was to name his fee after the building was completed would meet with public acceptance in any country; and it would be open to as much uncharitable and injurious imputation on the part of the public against the profession as the percentage system is, and, perhaps, even more. With the main principle of M. Bartaumieux, that architects should be at liberty to name their own fee for their work, instead of having it "tarifée," as he expresses it, we are theoretically quite in accord; we have often said that we think the percentage system of payment a very faulty and objectionable one; but practically it seems to satisfy the architects of this country, and their clients, for the most part at all events; and if architect and client are both satisfied, we do not know what more is to be said.

AT the last meeting of the Hellenic Society, on Thursday, the 23rd ult., Mr. H. H. Statham gave a short address on the subject of Greek mouldings, mainly with the object of calling the attention of the Society to the importance and interest of the subject. A diagram of various sections of mouldings was handed round to members present, showing the function and formation of mouldings, and illustrating the contrast between what might be termed the orthodox Renaissance mouldings and the superior refinement of the Greek mouldings. The practical object of the address, Mr. Statham added, was to induce the Hellenic Society to take some steps towards getting together something like a complete illustration of the various forms of Greek mouldings in full-size sections. It had been long recognised by architects that sections of mouldings should be taken full-size to be of real use for study and as historical evidence; but while this had been done for many Gothic mouldings (as in the supplement to Sharpe's "Parallels"), the more refined mouldings of the Greeks could mostly only be found illustrated on a small scale: even Mr. Penrose's well-known work only giving some of them to a scale of one-third the actual size. As there were now two or three architectural students connected with the English School at Athens, he thought there would be opportunity, through the Hellenic Society, for getting some useful illustrative work done and published. It is understood that the subject is to have the consideration of the Council of the Hellenic Society at an early date. At the same meeting Mr. L. R. Farnell read a paper on the Classical Museums of Copenhagen, Stockholm, and St. Petersburg, giving a general account of their collections and discussing certain antiquities that have not yet been published, or not yet been sufficiently explained. The paper will be printed in the next number of the Journal of Hellenic studies.

REFERENCE has often been made in our columns to the neglect and rough-usage which have been the lot of the stones of the Burlington House Colonnade. These *disjecta*

membra of a once-famous and admired structure have, to the shame of successive Governments, been allowed to lie prone in Battersea Park for many years. What is their present condition, and what may be their ultimate fate, may be gleaned from the following somewhat gruesome report presented to the Metropolitan Board of Works (to whose care Battersea Park, Kennington Park, and Victoria Park have lately been transferred from H.M. Office of Works) by its Parks, Commons, and Open Spaces Committee :—

"On visiting Battersea Park on Saturday last, the attention of your Committee was called to a large quantity of stone lying in the Park, and occupying a considerable area of ground. This stone is the material which formed the colonnade at Burlington House, Piccadilly, and which was a structure of much architectural beauty and historical interest. It has been lying for over twenty years in Battersea Park, to which place it was removed by Her Majesty's Office of Works, and as it has been left unprotected and exposed to the roughest possible treatment, children having been in the habit of using it as a playground, and as much of it has been mutilated in a serious manner, it cannot be utilised without such an extensive outlay as your Committee are not prepared to recommend the Board to incur. They therefore recommend that the Government be asked to remove the stone from the Park."

The discussion on this report evoked some amount of latent and unsuspected solicitude for architecture on the part of several members of the Board. Mr. Harben intimated that it would shortly be the painful duty of the Parks Committee to bring up a report on the condition of the parks recently placed in their charge, "showing the most effete management of the parks" by the Office of Works. Mr. Lindsay very pertinently observed that public attention ought to be very strongly drawn to the conduct of the Office of Works in regard to the remains of the Burlington House Colonnade, because for many years past questions had been asked in the House of Commons about these stones, and successive First Commissioners of Works had invariably replied to the effect that "the stones were in good condition and were being carefully preserved." Mr. John Jones suggested that the Board, instead of asking the Government to cart away the stones as so much useless *débris*, should rather, with the aid of the Superintending Architect, re-erect the stones, either as an entrance gateway or in some other position. Mr. F. H. Fowler and Mr. Selway spoke to the same effect, and it was suggested that the Government might be asked to make a grant of a couple of thousand pounds or so to enable the Board to re-erect the stones with something like completeness, but the suggestion did not find much favour, and ultimately the report of the Committee was adopted.

DR. DÖRPFELD'S paper on the "Old Athene Temple of the Acropolis," just published in the last issue of the *Athenian Mittheilungen* (Band xii., Heft 3) will excite great interest in the archæological world, and, in connexion with the plan we gave last week of the Acropolis discoveries, may be of special interest to our readers. Dr. Dörpfeld maintains a thesis which, if we accept it, revolutionises all our long-hallowed traditions as to the relation between the Parthenon and the Erechtheion, and compels us to treat in a new light many a Classical passage and many an inscription. We can only briefly state his position, and our bald statement does necessarily scant justice to Dr. Dörpfeld's exposition. The original state of affairs on the Acropolis was, he believes, as follows:—Athene, worshipped as Polias, was from very early days the presiding goddess; she had her temple on the site and, perhaps, in part, identical with the temple Dr. Dörpfeld has discovered. Within the sacred precinct, Erechtheus had a small and quite subordinate shrine, which may have gone by the name of the Erechtheion, but was not at all of the stately proportions of the present building; within the precinct was also the sacred olive tree, the trident mark, and the like early cultus symbols. Close at hand was the king's palace (noted on the plan). In the time of the Peisistratidæ to the shrine of the Polias was added a colonnade. This was burnt down by the Persians, much damage done to the temple generally, but the ancient xoanon which had been taken to Salamis was saved. The temple was hastily restored, but it was decided to build a new and more splendid edifice, and therefore no trouble was taken about setting up the colonnade. The "Parthenon" was built, and from henceforth the other temple was called "the ancient temple" (ὁ ἀρχαῖος νεώς) or by some similar title. All the passages, speaking of the old temple, hitherto taken of the Erechtheion, Dr. Dörpfeld refers to his own newly-discovered temple. The Erechtheion was then rebuilt in its present eccentric form; it was to serve the purpose of a sort of museum for various old cultus symbols. Thither the old Polias xoanon was transferred, now rendered superfluous by the cultus image of the Parthenos. Dr. Dörpfeld thinks that in all probability the architects who planned the Erechtheion expected that the old temple would speedily be pulled down, or they would not have built the Caryatid porch so inconveniently close to it; possibly here, as in the case of the Propylæa, priestly influence interfered.

THE *Daily News* briefly reports a discovery at Athens which promises to be of great interest. At the south-east corner of the Parthenon the workmen have come upon the head of a male statue, the colouring of which is still vivid. The material is porous stone, and the style early archaic. The great importance of the discovery depends on whether the excavators are right in their supposition that the head belongs to some fragments found a few days before of a serpent-like body "ending in a fish-tail." A fish-tail would stamp the creature as a Triton, and such is the interpretation the *Daily News* correspondent suggests. A serpent-tail would rightly belong to old king Cecrops himself.

IN the recently decided case of Croft *v.* The Rickmansworth Highway Board it was elicited that there was no system of drainage at Rickmansworth, whereupon Mr. Justice Kekewich remarked that he was sorry for Rickmansworth. We suppose that the sanitary state of Rickmansworth is no worse than that of many of the small towns, or large villages, which are to be found all over England. A town on gravel soil, such as we believe is the case with Rickmansworth, has temptation to abide by old-fashioned systems, since natural percolation takes the place of artificial removal of sewage. This is all very well, but it is probably only a question of time for the water supply to be some day contaminated. We may also observe that in this trial it was proved that highway authorities are in the habit of constructing "dumb-wells" to receive the water from the roads. This water is often in some places contaminated with sewage from cottages, pigstyes, &c. when there is heavy rain, and the practice does not seem to be one which should be indiscriminately persisted in.

ON the very day on which the debate in the House of Lords, on the insanitary condition of the Dublin Barracks, took place, as mentioned in our last number, a very painful sensation was excited in Dublin by the sudden death of the Rev. Dr. Jellett, the Provost of Trinity College, from the same cause which has proved so fatal in the barracks. On February 15th, Dr. Jellett was attacked by sore throat, being the fourth member of his household so attacked. Dr. Head was called in, and prescribed, but on the following day the symptoms were more alarming. On Saturday the arm of the provost had become swollen to four times its ordinary size, but there was no sense of pain in it. All that medical science could do was tried, but the case was hopeless from the first, and the provost died on Sunday evening. The *Dublin Express* states that the cause of death was blood poisoning caused by the escape of sewer-gas, and adds that it is a strange comment on the boasted efficacy of sanitary science that last year a sum of 250*l.* was expended upon the sanitary arrangements of the provost's house.

WE have received the following communication from the Leicester and Leicestershire Society of Architects:—"At a meeting of the Council of this Society, held on the 27th February, several letters and documents issued by a Society of Architects and others, under the name of 'The Architects', 'Engineers', and Surveyors' Registration Act Committee,' were read and considered, and it was unanimously resolved to petition against the passing of the Bill for the compulsory registration of Architects, Engineers, and Surveyors, now before Parliament."

THE *Scotsman* of Tuesday prints a long letter from the Secretary of the Society for the Protection of Ancient Buildings in regard to the proposed restoration of Dunblane Cathedral. We are not, as our readers are well aware, adherents of the Society in question, but they are certainly in the right in their comment on the words they quote from a memorial addressed to the Office of Works, to the effect that the object of the restoration is "to conserve for many generations. while conservation is still possible, a celebrated and beautiful ecclesiastical edifice." If that is the object there is no doubt that what is termed "restoration" is the very way to defeat that object, and so far the Society's protest is perfectly right. If that is the footing on which the "restoration" is desired, the restorers have no ground at all to go on. They would be destroying the archæological interest of Dunblane, not conserving it. The real question is, do the people of the district really desire to have the old building to worship in? If so, that is the first consideration, and they will be quite justified in putting it in proper repair for that purpose. But if the only, or chief, motive is to preserve and hand down an ancient monument, then restoration is an absurdity, and would defeat its own end. It would only hand down a sham, not a real relic.

THERE existed but small warrant for the fuss that was made a few days since by some daily papers over the demolition of No. 21, Austin Friars. Mr. Fleming, the owner, had to show to his visitors nothing more than an old-fashioned town house, of four floors, shored up, and blocked in by its later neighbours. The by no means remarkable main staircase; the brickwork safe, with a very ordinary modern iron door, in the beer-cellar; the spacious kitchen range, and its adjoining blue and white tiled Dutch oven; a well at the foot of the staircase leading down to the basement,—all evoked a chorus of childish wonder and delight. But the site *is* worthy of notice: for this house and large garden, stabling, &c., lie, north and south, between Throgmorton-avenue and that part of Austin Friars,—overlooking the garden along its eastern side,—which was until lately known as Winckworth's-buildings. The ground formed part of the pleasaunce of the Friars Augustine, whom Humphrey de Bohun, Earl of Hereford and Essex, established here in or about the year 1253.* Situated just beyond the range of the Great Fire in this quarter of the town, No. 21, Austin Friars, was in the occupation of Hermann Olmius, a Dutch merchant, during the period 1670–1714, as some title-deeds witness. Olmius has, perhaps, something to answer for as touching the Dutch oven. He belonged, no doubt, to the community of Walloons and others who are known to have worshipped in the nave of the Friars' church. From him the property passed, by a marriage, to the Tierrenoults, a French mercantile firm, and from them to another French house,—that of Minet. A M. Minet, banker and merchant, flourished about 100 years ago, and is reputed to have conducted large financial operations for Napoleon. To the Minets succeeded the firm of Thomas, Son, & Lefevre who in their turn were followed, in possession, by Mr. John Fleming, of Robinson, Fleming, & Co. The site will be utilised for a thoroughfare, with new buildings, which we understand it is proposed to carry through from Throgmorton-avenue into Austin Friars. Mr. Charles Reilly, of St. Swithin's-lane, is archi-

* See *Builder*, May 28, 1887, p. 796.

tect for the scheme, in extension of the buildings that have been lately erected over the Drapers' Company's garden, between Throgmorton-street and London-wall. No. 10, Austin Friars, in the genuine Queen Anne style, and with a fine staircase, forms one of the views published by the late Society for Photographing Relics of Old London.

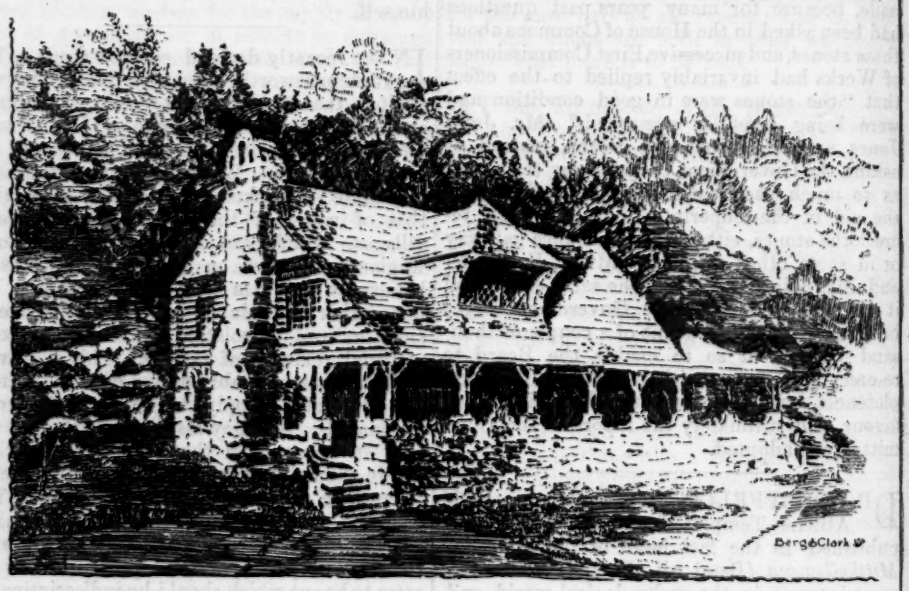
WE have received the first number of a new American architectural publication, the *Technology Architectural Review*, which appears to be an issue from the Architectural Department of the Massachusetts Institute of Technology. The publication is different from any other we have seen both in its aims and in its method. Its professed aim is "to call attention to and emphasise the resources of Classic architecture, and its usefulness as a basis of design," and the method consists mainly, as far as the first number shows us, in the publication of ideal designs for various buildings, based on classic models, and produced in photogravure. The illustrations are charmingly executed; the design for "a Casino" and "a fountain for a public park," in the first number, do not, however, show any particular beauty or originality. There is a reproduction of a very fine drawing by M. Brune, a Frenchman who got the Prix de Rome a good many years ago, and this was one of his *Envois;* it represents various capitals and Classic fragments drawn and shaded in a very effective manner. We cannot say that the first number has any very great architectural value as a suggestion of treatment based on Classic models; but this may develop as it goes on, and, at all events, the publication is a very pretty and picturesque one.

THOSE who advertise for competition designs from architects should really, in common fairness to the profession, make up their minds beforehand whether they mean to build or not, unless they are prepared to pay all the competitors for their labour. From a circular letter, a copy of which has been sent to us by one of the competitors, it appears that the Old Swindon and Swindon New Town Local Boards having advertised last year for designs for a "proposed Infectious Diseases Hospital," plans for which were delivered on June 8, 1887, have just returned the plans to competitors, informing them (under date February 13th of this year) that "it has been decided not to carry out the building." Thus a number of architects have been put to the trouble and cost of preparing plans, and kept a long time in suspense, merely to afford amusement to the members of the Board.

THE occurrence, so far, of something like a cycle of drought, lends extreme interest to the schemes in hand or in prospect for the supply of the great centres of industrial population from the rainy mountain districts, which now waste such floods of pure water by river discharge into the sea. Of the Glasgow supply from Lock Katrine we have recently spoken. The supply of Liverpool from the Welsh mountain districts, and of Manchester from Lake Thirlmere, must be anticipated eagerly by the water engineers of those cities. A scheme is now under the consideration of the Paris Municipality for the supply of that city from the lake of Neufchâtel. The distance is 312 miles, and the surface of the lake is 1,620 ft. higher than the mean level of Paris; while its area is 135 square miles. It is proposed to draw the water from beneath the surface of the lake, as is now done from Lake Michigan for the supply of Chicago. A tunnel 22 miles long would have to be constructed under the Jura mountains, leading to an arched conduit along the slopes of the hills, ending at a point 394 ft. above Paris. A flow of 4,400 gallons per second is proposed, or rather more than twice the water supply of London. It is proposed to utilise a portion of this supply as a source of hydraulic power, to light the City by electric light thus produced, and to give water-power to factories and workshops. There seems no reason to doubt that the command of such a head of water, if attained, might allow of the use of the water for hydro-dynamic purposes in the first instance, and for domestic use afterwards. The cost is estimated at 12,000,000*l.* It would be instructive to see a section of the line, as a tunnel of twenty-two miles long is not a trifle. Even its physical possibility must depend on the height of the highest point under which it passes, on which the heat to be encountered in the works must depend; and its practical possibility may almost be said to depend on the question whether intermediate shafts can be sunk, or whether there would be an attempt made to excavate from the two ends.

RESIDENCE.—MESSRS. ROSSITER AND WRIGHT, ARCHITECTS.

COUNTRY HOUSE IN THE GREAT SMOKY MOUNTAINS.—MR. W. CONVERS HAZLETT, ARCHITECT.



LOG CABIN.—MR. CHARLES I. BERG, ARCHITECT.

Examples of Modern American Domestic Architecture: from the Illustrated Catalogue of the New York "Architectural League" Exhibition, December, 1887.

"LE GÉNIE CIVIL" gives some particulars of the use of a windmill for the purpose of producing electrical energy. The installation has been erected for the purpose of illuminating a lighthouse near Havre, and consists of a Halliday windmill of a maximum efficiency of about 20-h.p. There are two dynamos, and the requisite number of storage batteries. The chief feature of interest is that the working has been rendered perfectly automatic. The dynamos will run at a speed varying with that of the windmill. The current from the dynamos has an efficiency changing but little, and a constant difference of potential; the intensity changing with the speed at which the machines revolve.

THE illustrated catalogue of the Third Annual Exhibition of the Architectural League of New York, which has been sent to us, furnishes in its very well-sketched illustrations an interesting example of the tendencies of modern American architecture, house architecture especially, towards a picturesque ideal founded on the suggestions of buildings of past times, old English houses

in particular, yet not without local touches of character peculiar to itself. We give reproductions of three sketches from the catalogue, showing three varieties of the picturesque house of modern America. The "Residence," by Messrs. Rossiter & Wright, is the most civilised type of the three, and might be a villa in an English park; the staircase window is prettily placed in the angle over the entrance door. The "Country House in the Great Smoky Mountains," by Mr. Hazlett, is more distinctly rural in type, and has the character of an old farm-house, half English half French in type; the whole thing is curiously suggestive of an old country. A few years ago America would be the last country one would guess for the ownership of a house like that: but it seems that America, having waked up to an admiration of the sentiment of old building, is endeavouring to make over again as much of this as can be made. The attempt sometimes seems a little too self-conscious, but many of its results are very pretty. The "Log House," by Mr. C. I. Berg, of which we have reproduced the sketch, is a class of building racy of the soil; the attempt to give it some architectural expression without losing its proper character is very successful. Among other designs illustrated in the catalogue is a very characteristic one for a "Country Hotel," by Mr. A. D. Pickering; "A Country Club House," by Mr. C. T. Mott; and a "Country Residence," with a windmill-like building a little way from the house, by Mr. J. C. Stevens. A drawing of "Old Boston Library," by Mr. F. E. Wallis, and one of a "Colonial Mantel" (from some New England house, we presume), by the same hand, form pleasant memoranda of the time when the form of eighteenth-century architecture, now so much imitated, was produced simultaneously on the other side of the Atlantic.

ON the question of amateur architects, which we touched upon last week, we notice that in a recent number of *Truth* Lady Marian Alford, whose death was lately recorded, is credited with the design of her house at Princes Gate. Lady Marian Alford certainly had an architect (the late Sir M. Digby Wyatt), who was quite competent to have designed the house, and it is rather too bad, after an architect has done his work, that another should take the honours. Lord Burlington in his day was popularly supposed to have designed the very charming screen to his house in Piccadilly, removed a few years since to make way for the rooms of the learned societies by Messrs. Banks & Barry; but we never heard that he laid claim to the design of the house itself. It is not improbable that Lady Marian Alford may have furnished some hints to her architect as to the kind of house she wished to build; but the suggestion that she designed the house is a preposterous one, and could only emanate from a person profoundly ignorant of the qualifications necessary for an architect.

LETTER FROM PARIS.

SINCE our last letter the committee for the decoration of the Hôtel de Ville has proceeded with its work, and having, as we noted, appointed MM. Besnard, Bonnat, and Jules Lefebvre to decorate the three large arcaded saloons, has selected a certain number of well-known artists to decorate the arcade with paintings of scenes from the principal promenades of Paris and the suburbs: a method of treatment very much opposed to the true idea of decorative work. Of these MM. John L. Brown, Luigi Loir, Vauthier, and Lépine are to work on the Salon des Sciences; in the Salon des Arts the similar situations have been entrusted to MM. Gustave Collin, Français, Bellel, and Lapostolet; and in the Salon des Lettres the artists for these subordinate parts are MM. Henri Saintin, Lavieille, Lansyer, and Guillemet.

In the Salle des Fêtes MM. Benjamin Constant, Gervex, and Aimé Morot have been commissioned to paint three large allegorical ceiling designs; and two smaller ones, which are to be on gold ground, are to be given to M. Gabriel Ferrier, who has been replaced in the Salon des Arts by M. Chartran, while the frieze in the Salon des Sciences, at first given to M. Gervex, has been transferred to M. Roll. The twelve main sections of the cove in the ceiling of the Salon des Fêtes are to be decorated by MM. Humbert and Milliet, who are to symbolise here the principal towns of France; four other smaller spaces of the same kind are to be treated by MM. Hippolyte Berteaux and Weertz; and lastly, in a gallery near the State staircase the large vertical panels have been entrusted to MM. Jules Breton, Harpignies, Damoye, Pelouze, and Rapin; that is to say, to the picked men of the modern landscape school. The vestibule is reserved for M. Lhermitte exclusively. The building will eventually be, it is evident, a kind of representative museum of the art of the present day in France, of the "modernist" school more particularly. The committee is now nearly at the end of its work of selecting artists, and then a competition will be organised for the remainder of the work.

The second and final competition for the decoration of the Salle des Fêtes of the Mairie of the 6th Arrondissement is now going on, and will probably be adjudicated by the time this letter appears. The three selected competitors, as before mentioned, are MM. Henry Lévy, Urbain Bourgeois, and Lionel Royer, and the work they have submitted is, in a decorative sense, very fine. That by M. Bourgeois personifies Liberty, in the form of a winged genius with a Phrygian cap brandishing a sword and robbing of his ermine mantle a figure who evidently represents Monarchy. There is a great deal of spirit in the work, though a little too melodramatic; it is a pity that the painter has tainted his work with political bias, with which art should have nothing to do, though that, unfortunately, is very likely one cause of his success in the competition. There is a much finer spirit in M. Lévy's choice of subject, Fraternité, "qui éteint les haînes entre nations ennemies et ramène parmi les hommes la concorde." It represents two young mothers with their children, who are embracing: one of them has a distinctly Alsacian physiognomy; an incident which just hints the political thought of the artist without obtruding it too much. The third competitor, M. Royer, has personified "The Struggle for Liberty"; in the foreground is Lafayette taking the oath before the altar of his country, at his feet a soldier dead, in the rear a crowd of combatants is attacking the Bastille. This is also a fine work, though a little confused in composition; but, on the whole, M. Lévy seems to us to carry off the honours of the competition.

A serious failure has been manifest a few days ago in the bridge which connects the Ile de la Cité with the *place* where the municipal palace is erected. The bridge, called the Pont d'Arcole, has been on the point of falling in, and the passage of it has been stopped in order to proceed with the repair and raising of the roadway. The bridge, which replaces a footbridge erected in 1828, is constructed with a single elliptic arch, consisting in reality of twelve iron arches, and was, though of light construction, believed to be perfectly adequate to its work. It was built in 1856 at a cost of 160,000 francs, and the repairs, or almost reconstruction, now required, will occasion considerable inconvenience to public traffic for some time to come.

One of the first things the Municipal Council will have to concern itself with in the coming session will be the reconstruction of the Mairie of Montmartre, which is to built from the designs of M. Varcollier. The site chosen is situate on the north slope of the Butte Montmartre, opposite the Church of Notre Dame of Clignancourt, and the steepness of the slope presents considerable difficulties, which, however, the architect has met very successfully. The plan shows a large central hall, with a grand staircase opening from it, and spacious galleries around, connecting the Salle des Mariages with the Salle des Fêtes; the whole arrangement is well suited for the large meetings likely to take place in the Montmartre district,—one of the largest and most populous of Paris. As soon as M. Varcollier's plans are formally approved the work will be pushed rapidly on, in order to open the building during the Exhibition period.

The Minister of Commerce has formally reported that the Exhibition can be opened on the day originally fixed, the 5th of May next year. The recent snow has stood in the way of the work where the buildings are not covered in; but at the Galerie des Machines an army of carpenters is now putting up the immense scaffolding necessary for the erection of the principals of the iron roof, which is all being made and fitted first at the foundry at Fives-Lille. The getting up of the roof will probably be commenced in a few weeks.

In a financial point of view there seems to be nothing to fear in respect to the Exhibition, judging from the Ministerial report. Against the "crédit" of forty-three millions (francs) voted, the expenses up to December last had only amounted to eighteen millions; and in regard to most portions of the work on which accounts have been paid so far the actual cost has been below the estimates.

We have mentioned the proposal for a retrospective or historical exhibition of work, which will include several sections:—Anthropology, ethnology, "arts libéraux," "arts et métiers," means of transport, and art of war. It is proposed to set apart for this novel exhibition a large construction in two stories in the central nave of the Palais des Arts Libéraux, which will contain a series of pictorial illustrations of the *ateliers* of antiquity, of the Middle Ages, and of the modern period, down to the commencement of the nineteenth century. There is even talk of reproducing some of the ancient alchemists' laboratories (though we should think the available authorities for such a restoration are small), and the observatories of Alexandria and Pekin, &c. The committee also contemplates collecting within this space a certain number of ancient machines, such as the first locomotive constructed, &c., and to give facsimile reproductions of progressive improvements in the *matériel* of science, art, and industry. A complete carrying out of such a programme would, however, demand pretty nearly the whole exhibition instead of a small subsidiary pavilion.

The pavilion for the history of habitations, which is to be constructed from the plans of M. Charles Garnier, will have its place on the Quai de Billy, at the foot of the Trocadéro. A vote of 900,000 francs has been passed for this edifice, within which it is proposed to represent the history of human habitation at three epochs; the "geologic epoch," the epoch of transition, and that of history. It is a pity Viollet-le-Duc did not live to take part in the organisation of this part of the Exhibition; he would certainly have thoroughly enjoyed it.

The inauguration of the Salle des Portraits at the Louvre marks the *début* of M. Castagnary as Directeur des Beaux-Arts. This room, with a very bad light, contains about a hundred works. The best places have been reserved for the portraits of Louis David, Delacroix, Coypel, Fragonard, Ch. Lebrun, Greuze, Philippe de Champagne, and Gustave Courbet, M. Castagnary's favoured painter, whose much exaggerated merits would hardly, however, have brought him into this post of honour if he had not also had the merit of having assisted in the overthrow of the Vendôme Column in 1870. There are also to be seen in this room the portraits of Mansard, Bourdon, Puget, Poussin, Van Dyck, Miguard, and an admirable portrait of Rembrandt painted by himself. Up till now the task of M. Castagnary has been easy enough, because he has only had to collect portraits from the galleries of the Louvre and Versailles. The difficulty will be when he comes to the collecting of contemporary portraits.

We may here mention that a wealthy lady who has recently died, Madame Sévenè, has left a donation of about 400,000 francs to the Louvre, which seldom comes into such legacies.

We have at present open at the Palais d'Industrie the exhibition of lady painters and sculptors, which remains always in the same grade of honourable mediocrity. The exhibitions of the Mirliton Club and the club of the Rue Volney are also open and offer, as in former years, the spectacle of a few masterly works nearly lost among the productions of a host of amateurs whose talents are not equal to their good intentions. The "Mirlitons" has this year changed its locality to the Galerie Georges Petit, where also will soon open the annual exhibitions of the water-colour painters and pastellists. In regard to this latter branch of art, public attention is to be called in the next exhibition to the results of a new fixing process recently discovered, and which is said to be wonderfully successful,—a matter of some interest now that pastel painting has come so much into favour.

The monument to Gambetta will be inaugurated, it appears, next April, and not in

July. The work is in an advanced stage, all the sculpture in stone is completed, and the inscriptions are all cut. The bronze figures of children, and those of "Vérité" and "Force," are already placed in the position at the sides, and the group in bronze signifying "Democracy," seated on a lion, is being cast at the foundry of M. Barbedienne. This group, which is nearly 15 ft. high, is to crown the summit of the monument, in front of which will stand the statue of Gambetta.

The competition for a monument to be erected at Bourdeaux in memory of the Girondins is just adjudicated on, as far as the preliminary competition goes. From among twenty-eight designs sent in, the jury have reserved for the final competition those of MM. Esquie, Gaadet, Deveria, Larch, and Rouyere, all architects; and among sculptors those of MM. Labatus, Dumilâtre, R. Larche, and Steiner.

We may mention also a new statue on the horizon, so to speak,—that of the lamented De Neuville, which a committee of subscribers proposes to raise near his residence at the corner the Rue Verniquet and the Boulevard Pereire.

Of the death of M. Questel, and of his life and work, the *Builder* has already spoken, and we need not return to the subject here. We have to record in this letter the death of the painter August Clément, who, having first made a speciality of Oriental scenes, in his later life devoted himself to portrait painting. He was a pupil of Drolling and Picot, gained the Prix de Rome in 1856, and gained medals at the *Salon* and the Universal Exhibition in 1867. He died at the age of sixty-one. We ought not to pass over also, in an architectural journal, the death of M. Thiebaut, the well-known founder, whose name has been associated with many remarkable works in bronze. He was one of the most sympathetic with art and artists of all the men connected with art-industry in Paris.

RECLAIMING LAND IN HOLLAND.

THE silent and untiring industry of the Dutch nation has enlarged the area of their patrimony by more than a third within little more than half a century. In 1833 the area of the Netherlands was under 9,000 square miles; it is now over 12,600. It is by extraordinary perseverance, guided by competent engineering advice, that the Dutchman maintains his constant struggle with the sea; from which he is said to be daily recovering as much as eight acres of cultivable land. He has been taught to conquer by suffering; for between 1702 and 1825 the sea was the aggressor, and an inundation occurred about once in every eleven years. But for this bloodless conquest of territory Holland would now be the most densely populated country in Europe. As it is, she stands third in the rank, Belgium being the first, and England and Wales the second; while the United Kingdom, as a whole, stands fourth. The reclamation works of Holland are without parallel in magnitude. They have been carried on from the year 1440 to the present time. One of the latest, and the largest, of these enterprises was the drainage of the Haarlem lake, which covered an area of 45,230 acres, the ordinary level of the boezem, or catch-water drain of the district, being 10 in. below the ordinary low-water level in the Y. The water contents of the lake to be pumped out, without taking into consideration her daily increment, were estimated at 800 million tons of water. The bed of the lake was 14 ft. below the winter level of the boezem; and the maximum lift for the pumps was 17 ft. 9 in.

The first efforts towards reclaiming the land submerged by the Zuyder Zee date back about thirty-nine years, when it was proposed to form a dyke from Helder to the continent. In 1866 it was pointed out that the drainage only of the southern part of the Zuyder Zee was attainable. The Government engineers then proposed a line of dyke about thirty miles long, running from a point near Kampen to Blokkershoek, and enclosing about 389,200 acres. On account of the extraordinary difference of more than 27 ft. between the extreme levels of water inside and outside the dyke the engineer Beyerinck proposed to form a canal behind the main dyke, in order to distribute the pressure between two banks. The crest of the main dyke was to be 16·41 ft. above the datum of the Amsterdam Peil, and to be 19·7 ft. wide. Ring canals, that is to say exterior intercepting channels, were to be formed to carry off the water of the rivers Vecht and Eem, and three main interior canals were to be made within the Polder. The time requisite for the completion of the scheme was estimated at sixteen years, and the cost, including interest during construction, at 14,289,200*l*. The value of the land to be reclaimed, which, after deducting the area required for dykes, canals, roads, &c., is about 339,200 acres, was estimated at 42*l*. per acre. Exclusive of the expenses for military works and for interest, the total cost of the improvement was taken at 27*l*. 11s. per acre, and including the same at 42*l*. 2s. The sales of ground in the new polders of the Y realised from 59*l*. to 92*l*. per acre. It was proposed to distribute the sales over fourteen years, throwing no more than 24,700 acres annually on the market.

YARMOUTH TOWN-HALL.

UNDERPINNING.

THE following account of a very critical and daring operation has been forwarded to us by Mr. James E. Teasdel:—

In 1882 a new block of Municipal Offices and Law Courts was built at Great Yarmouth, partly upon, but on three sides overlapping, the site of the then demolished Town-hall of 1716. The new structure measured 132 ft. by 108 ft. by 50 ft. high to the parapet, with a clock tower 110 ft. high, the whole weighing about 5,000 tons, costing 30,000*l*. Its architecture is of modern Queen Anne, with mullioned windows, square-headed below and circular at top, the construction being of red brick above the string course, with red St. Bees stone facing at base, moulded plinth and brick parapet, with ornamental stone cornice and fascia carved in relief.

The subsoil consisted of the gravel bank which the ocean deposited a thousand and more years ago, 16 ft. to 18 ft. of ooze, subsequently contributed by the three rivers and by river-side vegetation, surmounted by about 5 ft. of made ground, into which the trenches were cut for the concrete foundations of the new building. The River Yare and its wooden quay head were 70 ft. distant.

The structure which six years ago had its birth on such a site gave early indications of unequal subsidence; this continued more particularly in wet seasons and at low tides, until in 1886 it apparently approached the limit of safety, and steps were taken to underpin that portion which had settled most by the insertion of concrete blocks beneath the foundation.

The impracticability of removing the water from any trenches made for this purpose, without at the same time jeopardising the building, led to this attempt being abandoned, as also was the proposal to widen the foundations by the insertion of wrought-iron needles through the brickwork, and supporting them near the ground on the previously made, but not used, concrete blocks.

By November, 1886, the west front of the building had sunk over a foot at its ends and 8 in. at its centre, and there were some ugly fissures in it, as well as in the north wall, accelerated by pumping away the water to insert the concrete blocks as before mentioned. The walls and tower had not only settled, but were leaning towards the river. The Town Council, therefore, resolved to demolish the western portion of the block with the view of its being re-erected on more stable foundations. The cost of pulling down and re-building would have exceeded double the present sum, as the same obstructions would have been met with; and, of course, necessarily included rents for new offices, removal of furniture and fittings, commission and contingencies. The work was to occupy about three years.

A scheme was then submitted to the Town Council by Mr. Duckham, of the Millwall Docks, Engineer, in conjunction with Mr. James E. Teasdel, engineer and surveyor, of Great Yarmouth, for preventing the further subsidence of the crippled portion of the block, and lifting the portions which had settled most, to the level of that which had settled least. The proposal also included the straightening of the bulged walls.

The prominent features of this scheme were:—

Firstly, cast-iron screw cylinders (those as adopted varied from 2 ft. 6 in. to 3 ft. diameter) placed at intervals of about 9 ft. inside and outside the main walls, and screwed down into the ballast, then filled with cement concrete. Secondly, double lines of wrought-iron girders, I I, on the top of the cylinders, parallel with the walls. Thirdly, wrought-iron needles, 14 ft. to 16 ft. long, mostly 16 in. by 6 in. I with a top table 12 in. wide, and averaging 8 ft. long, equal to the width of the concrete under the brick footings, passed through under this concrete foundation at intervals of about 3 ft. 6 in., and suspended at each end by two 2-in. bolts from the before-mentioned I I girders. The insertion of these needles and the tightening of the bolts, transferring the weight of the building from the unstable ground on to the screw piles. The tower, weighing 700 tons, and having a base 20 ft. square, was to be somewhat differently treated. Five special cylinders of 4 ft. 6 in. and 5 ft. diameter were proposed for this, to be placed as the adjacent walls permitted. The eastern and western walls of the tower, *i.e.*, those without openings on the ground floor, to be each sandwiched between a pair of massive lattice girders below the floor level. Needles of I I section to be inserted through the walls and through the girders, and bolted up to the upper member by four 2 in. bolts at each end.

This proposal of Messrs. Duckham and Teasdel was adopted, after severe criticism and opposition, and a contract for the chief portion of the work was entered into by the Town Council with Mr. Thomas Gibson, of Westminster Chambers.

The first cylinder was pitched at the end of May last, and the work was completed in November. The whole western portion of the block and tower are supported on a sort of gridiron of wrought-iron joists, suspended from the girders which rest on the pile tops.

The suspending bolts have nuts at each end and 12 in. of thread; by a systematic and gradual screwing up of some more than others, the low parts of the block have been lifted to the higher level, the unsightly curves have been taken out of the building, and the tower set upright by raising its lower side.

The ground has been cleared to a depth of 2 ft. under the old concrete, and the trenches have been filled in with cement concrete, forming one mass, encasing the pile tops, girders and bolts, thus forming a new foundation 7 ft. wider than the former one, irrespective of the support given by the immovable screw piles. The tower girders have been similarly concreted. The replacing of the floors, making good the damaged masonry, and refitting in general were then proceeded with. The damaged places in walls were cut out through the entire thickness, the wall and windows adjoining the tower being rebuilt all in Portland cement.

The subsidence in the walls of the main hall and tower during these operations was considerably less than was anticipated, being only nominal, and this was rectified by the lifting process. What settlement did occur during the progress of the works was chiefly due to the flooding of the trenches by a high tide rising through drains in July last, this was at once stopped by insertion of the cross girder needles.

Bits of old Yarmouth in the shape of ancient wharfing and wreckage were found, the latter possibly of the period when the Danes and Romans sailed over this site *en route* for Caister and Norwich, when rudders were hung by hide or hempen lashings, and when moss was used for caulking, before oakum was produced in certain Government establishments. An old landing-place or draw-dock was found 12 ft. underground, at the foot of the main staircase. Small pieces of pottery, tiles, horn, and peculiar fossil formations were also met with, but only one coin. These remains were interesting, but as they strenuously opposed the invasion of the new work they were not welcomed by the Contractor.

Operations so unique and so extensive upon soil so treacherous, necessarily required great care and special skill, not only in carrying out the projected works, but in dealing successfully with the emergencies and contingencies unavoidably connected therewith. The Great Yarmouth Town Council and those interested are to be sincerely congratulated upon the complete success of what to many persons seemed an impossible project. It is satisfactory to know that the reasonableness of the scheme, and the stability of the completed work, are now beyond dispute.

Though the Town Council did not agree to straighten the west wall, the bulge in it has been considerably improved by the lifting operations. The tie-rods in the roof and upper floor, which were slackened thereby, have had to be screwed up to take their proper strain. The main roof shows no defect, nor do the internal walls and plastering reveal any signs of fracture to have been occasioned by these operations. This was in a great measure due to the shoring and cradling used to walls and openings so as to prevent any displacement when underpinning was being carried out, and more particularly so in the lifting.

The effect of screwing down the piles reduced the rate of settlement of the building by consolidating the adjacent ground. The western portion of the building and tower are now sustained by a better foundation than any other structure in the neighbourhood, being in reality upon what was, in point of fact, the old Yarmouth sea beach, composed of sand and coarse shingle.

Mr. Teasdel, who at the first onset, from his knowledge of the locality, had intimated that the new hall would be insufficiently supported, had also, when settlements first occurred, advocated the underpinning in a similar manner as now carried out.

The work was carried on from six a.m. to eight p.m. sometimes later, and considering the obstacles met with no time has been lost. The whole will be ready for re-occupation next month, the time thus occupied having been ten months against the three years required for the other scheme. Moreover, the inconvenience of moving officials and courts to new quarters has been avoided, with the exception of the Accountant and Harbour Master, the municipal business including that of the Quarter Sessions, Magistrates, Town Clerk, Surveyor, &c., has been continued without interruption in the eastern portion of the building.

It is stated that the total cost of the work and its contingencies will be well within the estimate, 8,250*l*.

THE ARCHITECTURAL PROFESSION AND THE BUILDING TRADE.

INSTITUTE OF BUILDERS.

A MEETING of this Institute was held on the 16th ult., at 31, Bedford-street, Strand, when Mr. F. J. Dove read a paper on "The Relation of the Architectural Profession to the Building Trade." Mr. H. T. Ashby (Vice-President) occupied the chair, and there was a good attendance of members.

Mr. F. J. Dove, of the firm of Dove Brothers, then read a paper entitled "The Architectural Profession and the Building Trade, in Relation to each other, Critically Examined." He said that at a time when there was reason to suppose that, ere long, an application would be made to Parliament by the Royal Institute of British Architects or by some other body in connexion with the architectural profession, for power to give certificates of qualification to those who were seeking to practise as architects, and who, without such certificates, would be unable to follow that vocation, it appeared to him not inopportune for the members of the Institute of Builders to examine the relations at present subsisting between the architects and the builders, and to offer an opinion on the subject from a builder's point of view. But he wished it to be understood that he alone, and not the Institute of Builders, was responsible for all the views expressed by him. Should the application to Parliament succeed or not, the remarks he had to make would not be devoid of a material bearing upon what he, for one, did not consider an altogether satisfactory relationship. He thought it could not but have struck most builders who had had a moderate experience of their business that for the past twenty years practical knowledge had been becoming less and less a part of an architect's education, and that in the rising generation it promised to become extinct. Originally, an architect was one who, by his superior skill and ability, rose to that position by a perfectly natural process of progression, *i.e.*, from the bottom rung of the ladder to the top; and having achieved that position, his knowledge was both practical and theoretical,—but in the first place practical, and then artistic. At what period in our history the practical and the artistic were separated it would be impossible to say with precision. What most concerned us now was the knowledge that they are separated. Mr. Dove then proceeded to enumerate "a few of the many monuments and buildings and their architects" in support of his contention. He began with the Druidical remains on Salisbury Plain, which he thought might be cited as a first attempt at architecture in this country; here he thought we were pretty safe in assuming that the priests were at once the operatives and the architects. He next cited the Greeks and Romans, whose works were carried out, he argued, to a considerable extent by the hands of the very men who designed them. The same course was pursued in Mediæval times by the various orders of monks and lay brothers. Since the Reformation, he further argued, all the best architectural work had been designed by men who combined practical knowledge of handicrafts with theoretical knowledge and the power of design. Mr. Dove entered into a long historical disquisition in support of this thesis, instancing Inigo Jones as having been apprenticed to a carpenter and joiner, and Sir Christopher Wren as having allied himself with men like Strong, a master-mason (afterwards an architect of repute); Jennings, a master carpenter; Bird, Cibber, and Gibbons as sculptors and carvers; and Tijou, as smith. These and other statements that he (Mr. Dove) had advanced would serve to show how closely identified the practical and the theoretical had been in the past; at any rate, they would, he thought, be quite sufficient for the purpose of establishing the fact that, should a separation take place (as, in the opinion of some, was gradually occurring, and which would certainly occur if legislation on the subject was not directed by others than those under whose auspices it was being advanced), then, in his humble opinion, the architecture of the future would suffer in its most important element, viz., its very foundation. Mr. Dove next proceeded to refer to the state of architecture in the times of William and Mary, Queen Anne, and the Georges, remarking that the work of the latter reigns had been termed, in scorn and derision, "builders' architecture." He would, for the sake of argument, take that for granted, and partially admit that probably the picturesque was banished for the sake of substantiality, utility, and comfort; although, even in purity of design, where design was indulged in, it would be difficult to point at the present day to examples equal to the charming staircases of that time, with all their well-thought-out details, for ease in ascending and descending. Many examples of such staircases could still be found in the neighbourhood of Bedford-row and other parts of London, and in many provincial towns and country mansions. Let such staircases be compared with some of the modern productions, with twenty-five or thirty steps without a landing, break-neck risers and winders, twists in rails that agonised one to behold, and dadoes, tiled or not tiled, of which the less said the better. He held that these Georgian staircases must, of necessity, have been the work of architects having good practical knowledge, and upon them their designers must have bestowed as much time as was now given to a complete house. The same remark applied to chimneypieces and doorways, and to the elegant wrought-iron gates of the period under consideration. Now, although it was very gratifying to find a few eminent men who had in a certain sense resuscitated, faintly, work of a kindred kind to that referred to, those gentlemen, he felt sure, must have felt that when success had crowned their efforts, their success had been in a great measure due to the skill of those by whom the work was carried out. Coming to works of a more recent period, Mr. Dove instanced the Houses of Parliament and the British Museum as two public buildings of which the present epoch had every reason to be proud. There were also many ecclesiastical buildings and townhalls scattered about the country which reflected great credit upon their authors, owing, he took it, to the fact that the most successful were faithful reproductions of grand old examples. One was also fully sensible of the merits of much of our commercial and domestic architecture, but there were many pretentious buildings, conspicuous for their want of proper construction. Terra cotta was abundantly used now; it was a material which was all very well in its way where sound judgment was exercised in its use, but which was execrable in its adaptation in the hands of unpractical men, some of it being hideous in its colour, a great deal of it untrue in its lines, bad in its joints, and worse in its bond: at which the skilled workman stood positively aghast, and exclaimed "This may be art, but it certainly is not workmanship." Without stopping to particularise many of the extraordinary freaks perpetrated in bond, both in brick and stone, Mr. Dove said he would pass on to suggest a remedy for a state of things which had been allowed to lie dormant too long, and had rendered the builder's position very irksome, he knowing full well that it was his duty to carry out absurdities in construction and in detail; in fact, the more foolish and ignorant the architect, the more impatient was he of advice. The remedy was to his (the lecturer's) mind a very simple one. No person desiring to own the title of architect should be allowed to practise until he could produce to the authorities (*i.e.*, the Royal Institute of British Architects or its kindred associations) a certificate that he had passed at least two years in a builder's workshops or on a building, whether sent there by an architect or not; so long as he obtained the necessary experience, it mattered not whether it were directly under the builder or on the works on which the builder was engaged. One thing should be made imperative, *i.e.*, that he should have a certificate to the effect that he had spent all his time diligently during the period stated, and the person certifying should be a member of the Builders' Institute or of some respectable kindred society or association affiliated to it, or to the National or the London Associations of Master Builders. Mr. Dove went on to argue that if thus equipped by practical experience, the architect would not be so ready to accept advice from the first charlatan who came with his nostrum for ventilation or anything else. *En parenthèse*, he called attention to the Sanitary Registration of Buildings Bill, which he said was a measure conceived and pushed forward by a nest of doctrinaires, while the builders, who knew more about the science of sanitation than any of those self-complacent gentlemen, were not to be conferred with, but totally ignored. In conclusion, Mr. Dove said that his remedy for the present state of things would be as much in the interest of the architectural profession as in that of the builder; but the proposed technical school which he understood to be in contemplation would increase rather than diminish the class of unpractical architects. Whether architects succeeded or not in obtaining the powers from Parliament which some of them desired, but which he did not think would be a great boon to them, one thing they could do, as Institutes and associations, and he hoped they would do, viz., not to allow any one to become a full member without some such guarantee of practical knowledge as he had suggested.

In the discussion which followed,

Mr. Arthur Cates said he endorsed warmly very much of what Mr. Dove had said, and, though some very hard expressions had been used, he was sorry to say he must admit the justice of many of them. It had been a feeling amongst those who took an interest in the progress of the profession that too often young men indulged in the easy and delightful artistic branch, regardless at an early stage of that knowledge of both theory and practice so necessary to enable them to realise their conceptions. Whether Mr. Dove's remedy of two years' experience in a builder's shop would be agreeable to all he doubted very much, but some remedy should be applied, or the profession would be divided into two classes, the artistic and the practical, a consummation which no one would desire, and towards which some thought that the proposed Bill to register all architects must tend. He did not think from what he had seen of the papers lately circulated in support of that Bill that there was any justifiable ground for the statements therein made with regard to the condition of the profession. He had a strong impression that amongst those primarily responsible for the state of things which now existed they might possibly say that the first were the builders themselves (hear, hear). The builders had made everything a great deal too easy for the architects. They had arranged everything in such a nice way that the architect really came in contact with only one man, and did not come in practical contact with the handicraftsmen at all. There-

fore he was not in touch with the workmen, and that was an important matter which should be laid to heart. In days gone by, it was the habit and practice of the architect to deal direct with the mason, the bricklayer, the carpenter, the joiner, and the plumber. Contracts were given to the handicraftsmen, and so the architects came in contact with the men who did the work, and not merely with the respectable gentleman who drove up in his brougham to ask for "that little certificate." In coming into contact with those men, the architect necessarily acquired a certain amount of knowledge himself. The architect of the present day, however, was too often in the hands of two persons, the clerk of works and the builder, and he could dream at his desk and produce delightful drawings, which with their assistance, and the help of the quantity surveyor, could be realised. The clerk of works and the builder took charge of all the work, and the specialist also relieved him from a great amount of responsibility. It was much to be desired that the architect, as a young man, should have it pointed out to him that for the proper practice of the profession a thorough knowledge of the theory and acquaintance with the details of every handicraft practised in the building trade was absolutely essential (applause). Whether, however, for the purpose of acquiring that knowledge it was essential or desirable that he should spend two years or less in a builder's workshop he very much doubted. He believed that a competent young man would, with such opportunities of visiting works and builders' shops as his master ought to give him, acquire a great amount of knowledge which would be valuable and useful to him, and that the time Mr. Dove had mentioned as necessary to be spent in a builder's shop would, a great deal of it, be wasted. It was unnecessary that a young man should be able to use the tools if he knew how they should be used, as work of that kind was generally disturbing to the other energies, developing the physical energy to the detriment, perhaps, of his thought, and diverting his attention in a way which would not be desirable from the more artistic of his studies. By the system of education which he hoped the Royal Institute of British Architects would soon establish the young man would be able to go through a settled course of study, which would improve his acquaintance also with the practical details Mr. Dove had so much commended. Whether that would not be successful ultimately in improving the status of the architect amongst the builders, and giving every man an opportunity of seeing what practical work was, he did not know, but he only hoped it would. In many instances the very greatest advantages had resulted to young men from being employed on buildings as clerk of works, inspector, or assistant (applause). That, he believed, would be better than spending so long a period in a builder's office. So that, although he agreed generally with Mr. Dove, he could not agree with him in detail. He was glad to hear Mr. Dove express his opinion about terra cotta, for although there was some beautiful work done in it, its use had become a mania and a craze. With respect to the question of "provisions," that, to the architect, the builder, and also to the quantity surveyor, was exceedingly important. The facility with which an architect could get over his work by introducing considerable "provisions" was very great indeed. The difficulty of always handling them, and dealing fairly with the builder, was great, and the questions which continually cropped up about the different phases of those provisions, were exceedingly serious; indeed, they were probably the greatest difficulties with which in his practice he had had to deal. On one more point he heartily agreed with Mr. Dove, and he might almost thank him for having expressed his opinion in regard to the Houses of Parliament. There was no building which had been more attacked and criticised than the Houses of Parliament, and with that abuse there had been an attack made to the effect that it was the work of an architect. There was no more excellent and beautiful work than the Houses of Parliament, and there was not a single fault that had been condemned in connexion with the building for which the architect was responsible. Had the conceptions of the architect been carried out without interference, the building would have been even more beautiful and more worthy of the nation than it now was; it had formed an excellent school for the artisans employed, and had thus established a high standard for work which had exercised a most beneficial influence on the handicrafts of the country, and it was agreeable to find that in the Institute of Builders a work of art like the Houses of Parliament should receive the high appreciation which it rightly deserved (applause).

Mr. Scrivener said he was somewhat surprised that Mr. Dove had not touched upon one of the most important of the relations between the architect and the builder,—he meant the conditions of contract. After many years' experience, he was happy to say that the vast majority of architects did not attempt to put before the builder anything unfair in the shape of a form of contract. The one agreed upon by the builders and the Institute of Architects was a fair one, but now and then builders had extraordinary things put before them, chiefly by the younger branch of the profession Mr. Dove had spoken of. Unfortunately, some builders would sign anything, and he wished they would always insist upon fair and equitable conditions, as it would be better for both the architect and the builder.

Mr. Ruddock said that as the architect who had superintended the building of the Houses of Parliament under Sir Charles Barry, the India Office under Sir Digby Wyatt and Sir Gilbert Scott, and other important works, he could affirm that in none of those contracts had he had any difficulty with the builders. He could speak of builders as gentlemen who had always treated him properly. With regard to the practical part, he quite agreed that the architect should be educated in that part of his profession, taking up joinery, masonry, or ironwork,—he did not care which. He would thus get a practical knowledge of the work, and would have acquired something he could never lose. Mr. Ruddock spoke somewhat disparagingly of the education of the present day, and considered that it was putting theoretical knowledge in the place of practical experience. He did not believe there were many men in this country who would understand joinery from what was taught them in those technical schools.

Mr. Sanders referred to the relative responsibility of the architect and the builder. That was sometimes exceedingly difficult to determine, and it could only be done by the mutual good understanding which ought to exist if there was to be any success with the building. They all knew the great objection the public had to too good an understanding of that kind, but it was essential to anything like success that that good understanding should really exist (applause). Whatever was done in the way of having a stringent contract, it was practically useless unless a fair understanding existed between the two, and that seemed to be the beginning and the end of the whole business.

Mr. Hall remarked that during the years he had been in business no one could have worked more amicably with the architects than he had. In spite of that, he favoured an arbitration clause, and that could not be better carried out than by having some one appointed as arbiter by the Royal Institute of British Architects.

Mr. Northcroft, as a quantity surveyor, said he considered that the times seemed to be entirely losing the spirit of "give-and-take" which used to prevail in the good old days. The consequence was that the quantity surveyor, who was the buffer between the architect and the builder, had a very hard time of it. As to the question of provisions in the contract, he could not say that he entirely objected to seeing them (laughter). At the same time, a good deal might be said against them on principle, more particularly as they led the architect in too many instances to give way to the specialist. The conditions of the contract would be more carefully drawn if the builders would only make a stand. He agreed with Mr. Cates that the young man would learn more as clerk of works or even as timekeeper for the builder in the course of two years than if he were put into the shop to learn manual labour. He thought it would be well if the architects and the quantity surveyors could go to the same school.

Mr. Farman spoke in favour of the proposed Registration Bill; and

Mr. Roumieu Gough followed in the same strain, predicting that the passing of the Bill was a foregone conclusion.

Mr. Titmass complained that, in regard to sanitation, doctors were imported into the matter, who took the whole thing into their hands, and quite put the architect, quantity surveyor, and builder on one side. Such men could not be judges of plumber's work, nor understand the technicalities of it.

Mr. Holloway said he was sorry to hear what had been said by Mr. Ruddock as to technical education. Though the practical way of gaining experience was without doubt the best, yet in these days people had to run pretty quickly, and if a man was compelled to get a thorough knowledge of all the stages of the building trade before starting as an architect, it would be a considerable time ere he had his first job. It was therefore well for such a man to have some technical knowledge of the building trade at the commencement, and he would be sorry if it went forth from the Institute of Builders that they were antagonistic to the question of technical education. Builders did not always act as they should towards the architect. There was now so great a demand to get a large amount of work done that the builder could not get that intimate knowledge of his works that he ought to have. In fact, there was a temptation for builders now-a-days to delegate all their work to subordinates, and many of the difficulties which arose were to be traced to that.

Mr. Kinninmont complained that too many builders were asked to tender for jobs.

Mr. Allport said he considered that while the architect was reasonably looking after the interest of his client, it was likewise his duty to protect the builder. He was brought up in an architect's office, but during that time he also went into a builder's office, and took great interest in the practical carrying out of every branch of the trade. Times were much altered now from what they were forty-five years ago, when the building trade was again divided into trades. He might say to Mr. Cates that, having worked at the bench, and been amongst masons, plumbers, painters, and, in fact, all trades, he had not found that the practical experience gained interfered with his studies. All contracts should have an arbitration clause, and he would suggest that a court of arbiters should be formed, composed of architects of known ability and repute, with surveyors of known responsibility, and builders of like known position, two or three of whom might be selected as the arbiters under a contract (applause).

The Chairman said he believed that if architects and builders met and discussed these matters a little more fully they would be able to treat them in a more practical manner than was now the case. He was pleased at the harmonious lines on which the discussion had proceeded. Any complaints that had been made were more against incompetency than intention.

Mr. Dove, in replying, remarked that Mr. Cates had somewhat misunderstood the line he intended to take in regard to the architect's education; in fact, the views of Mr. Cates and of himself were almost identical. At the same time, he did not consider the project for the Institute examination had been in every sense what it ought to be. The questions of provisions in contracts, and arbitrations, would afford sufficient scope for another paper. As to the Sanitary Bill before Parliament, he would insist, as with the proposed Registration of Architects Bill, that the builders should have something to say on the subject.

The proceedings then terminated.

Boring a Quicksand.—The scheme for the extension of the New York waterworks involves the construction of some extensive engineering works, amongst others, a large dam at Quaker Bridge. For getting in the foundations diamond drilling was used, in order to determine the geological formation. In the course of this work an extensive quicksand was encountered, which quite put a stop to operations until a plan was hit upon to overcome the difficulty. The engineer in charge of the work, Mr. Benjamin Church, gave orders for the drill to be withdrawn, and a very fluid grouting of cement was poured down the bore-hole. This found its way right through the sand, and in a few days set hard, forming a solid column based on the firm strata below. The diamond drill was then again brought into play, and bored through the cement column, taking a core out in the usual way, and so was able to get through the quicksand and carry on the work.

ELECTION OF THREE DISTRICT SURVEYORS.

AT the meeting of the Metropolitan Board of Works on the 24th ult., applications were received from candidates for the three District Surveyorships of (*a*) the Central Division of Battersea, (*b*) Clapham, and (*c*) the Southern Division of Battersea, and the detached portion of Clapham, these being the districts into which the old District of "Clapham and the Southern Part of Battersea," held since the year 1844 by the late Mr. I'Anson, was lately divided by the Board.

There were thirty-two candidates for the three appointments. The following is a complete list of the applicants, with the number of times each had previously been a candidate for a like appointment, viz., Messrs. H. Blackbourn, 7; H. H. Bridgman, 27; J. W. Brooker, 6; H. Cheston, 22; C. T. Coggin, 5; P. Cowper, 10; F. E. Eales, 9; G. Edwards, 14; F. R. Farrow, 7; J. M. Ferguson, 27; R. F. C. Francis, 14; J. Goodchild, 7; A. S. Gover, 3; W. Grellier, 28; F. W. Hamilton, 9; J. Hamilton, 17; G. Hamilton-Gordon, 12; W. J. Hardcastle, 14; E. Haslehurst, 16; A. Heyes, 9; G. Inskipp, 22; G. Jackson, 22; G. A. Lean, 19; E. W. Mountford, 6; H. A. Pelly, 12; R. E. Pownall, 13; H. A. Rawlins, 3; C. G. Saunders, 8; M. L. Saunders, 12; J. Slater, B.A., 5; W. H. Stevens, 19; and E. L. Swatman, 6.

Central Battersea.

The election for this District was taken first, and the preliminary ballot to reduce the candidates to six resulted as follows, viz.:—Cheston, 17; Francis, 16; Grellier, 18; Hardcastle, 27; C. G. Saunders, 15; and M. L. Saunders, 16. The subsequent voting (in which, by the Standing Order of the Board, each member votes for one candidate only) was as follows:—

	Second Ballot.	Third Ballot.
Cheston	7	*
Francis	1	*
Grellier	6	*
Hardcastle	23	34
Saunders, C. G.	0	*
Saunders, M. L.	10	13

Mr. W. J. Hardcastle was therefore declared to be elected, having obtained in the third ballot the votes of a majority of the members of the Board present. The successful candidate having returned thanks, the next election was proceeded with, that for

Clapham.

In the preliminary ballot the results were as follow:—Cheston, 24; Cowper, 12; Francis, 16; Grellier, 26; C. G. Saunders, 15; and M. L. Saunders, 21. The subsequent voting for this district was as follows:—

	Second Ballot.	Third Ballot.	Fourth Ballot.
Cheston	9	8	*
Cowper	2	*	—
Francis	5	*	—
Grellier	14	23	27
Saunders, C. G.	2	*	—
Saunders, M. L.	12	16	19

Mr. Grellier was consequently declared to be the successful candidate, and after he had expressed his acknowledgments, the Board proceeded with the election for the third district,

South Battersea, &c.

The preliminary ballot resulted as follows, viz.:—Cheston, 26; Cowper, 11; Francis, 11; Pelly, 10; C. G. Saunders, 14; and M. L. Saunders, 18. The further voting was as follows, viz.:—

	Second Ballot.	Third Ballot.
Cheston	21	22
Cowper	2	*
Francis	3	*
Pelly	1	*
Saunders, C. G.	1	*
Saunders, M. L.	14	19

Mr. Cheston, having the votes of a majority of the members present at the time of the final ballot, was declared to be duly elected, for which he thanked the Board.

Most of the candidates were kept waiting a very long time,—about two hours and a half. The method of deciding these elections is a very tedious one. Instead of being settled right off, other business is proceeded with while the scrutineers (two members of the Board) are counting the ballot-papers,—an operation which can hardly take more than five minutes for each ballot. The scrutineers are generally ready with their report a long time before they can give it in, but when they are ready with it the Board may be, and generally is, in the midst of a long-winded debate on some point of more or less importance, and as a rule it is only when the matter under discussion has been decided that the scrutineers are called upon for their report. Meanwhile the candidates are kept waiting at "the bar" of the Board-room in a state of expectancy more or less animated, according to the positions attained by them in previous ballots.

* The asterisks indicate that the candidates were struck out as having less than twenty per cent. of the total number of votes cast.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

THE twenty-first annual meeting of the members and friends of this Institution was held at the office, 21, New Bridge-street, E.C., on Tuesday evening last, Mr. J. W. Hobbs, Mayor of Croydon (President-elect) in the chair.

The annual report (read by the Secretary, Mr. H. J. Wheatley), stated that the year 1887 was not only notable as the fiftieth year of the Queen's reign, but was one of some importance in the annals of the Institution, as, in addition to the fact that the Institution had attained its majority during the year, its income had been greater than in any previous year. The total amount received was 778*l.* 13s. 8d., consisting of 303*l.* 17s. 0d. in annual subscriptions, 372*l.* 17s. 6d. in donations, and 95*l.* 6s. 1d. in dividends on stock. There was also a balance of 6*l.* 13s. 1d. from the Dinner account. The expenditure for the year was 424*l.* 18s. 8d., of which sum 325*l.* 16s. 8d. was for pensions and temporary relief. During the year Mrs. Louisa Hadrill, Mrs. Maria Bowtle, and Mrs. E. Holding were elected pensioners on the Relief Fund. Mrs. Julia M. M. Lyon, who was elected a pensioner in 1871, retired during the year in consequence of an improvement in her income: while Mr. William Harffey (elected in 1882) and Mrs. E. Mackness (elected in 1886) had been removed by death. At the present time the Relief Fund had a total of sixteen pensioners on its books, and three children were being educated, clothed, and fed in the Orphan Working School, as nominees of the three presentations held by the Institution. It was with much pleasure that the Committee noticed the increase in the number of clerks contributing to the funds,—thirty-one clerks who had not before subscribed doing so on the occasion of the last annual dinner, being ten more than in the year before. During the year a new section was added to the Orphan Rules, viz.,

"That no more than two children of one family shall be receiving the benefits of the Orphan Fund at the same time; and should there be no presentation vacant at the time when an application for the second child be made, no further presentation shall be purchased until the Committee have another eligible candidate before them, when, after due notice, an election by ballot shall be declared."

The ninth annual dinner took place at the Holborn Restaurant on the 29th of March, 1887, Mr. William Robert Freeman, the President, occupying the chair. The attendance was larger than on any previous occasion, and the subscriptions and donations announced were greatly beyond the average, and amounted in all to the sum of 410*l.* For that satisfactory result, and for the close personal interest taken by Mr. Freeman in every detail of the Institution during his year of office, the Committee tendered him their best thanks. The Committee had to announce the purchase of 400*l.* Stock, 200*l.* being on account of the Relief Fund and 200*l.* on account of the Orphan Fund. Mr. J. W. Hobbs (Mayor of Croydon) had kindly consented to accept the office of President of the Institution for the ensuing year. According to the rules, one-third of the Committee retired by rotation, but were eligible for re-election. In reviewing the Institution's progress during the past twenty-one years, the Committee, in conclusion, acknowledged their indebtedness to the building trade generally, and to the merchants supplying goods to the trade, for the support accorded, and expressed the hope that the Institution, now so well established, might be as well and as efficiently maintained.

Mr. E. Brooks, Treasurer, having read the general balance-sheet and the several statements of account,

The Chairman moved the adoption of the report and balance-sheet, and said he must congratulate the Institution and its officers on its balance-sheet and accounts, and not only on the results shown by them, but on their form. The Institution was also to be congratulated on having attained its majority, and upon the fact that it appeared to be fully alive to the responsibilities now entailed upon it, and was seeking to discharge them in the most adequate manner possible.

Mr. Howard Colls, in seconding the motion, said that as a past-President of the Institution, and one who had closely watched its work for many years, he could testify to the efficient and very economical manner in which the work of the Institution was carried out.

The motion was unanimously adopted.

On the motion of Mr. Turpin, seconded by Mr. Kentish, the thanks of the Institution were accorded to Mr. W. R. Freeman for his great services as President of the Institution during the past year.

Mr. Freeman, in reply, spoke of the pleasure which it had afforded him to work with the officers and committee of the Institution in promoting the success of so laudable an object as theirs.

Mr. F. T. Mullett, who gave an interesting account of the growth of the Institution, said that it had met with an amount of success which was undreamt of by its founders. For that success they were largely indebted to the help which had been afforded them by the master-builders of London. He moved that Mr. J. W. Hobbs be elected President for the coming year; that Messrs. Geo. Burt, jun., J. W. Burton, Joseph Hamblet, and C. T. Mander be elected Vice-Presidents; that Messrs. Thomas Docwra, W. G. Margetts, Wm. Farmiloe, H. W. Powis, E. T. Taylor, and Joseph Wilkinson be elected Governors; that Messrs. S. J. Thacker, Thomas Stirling, and Thos. Bishop be re-elected auditors; that the following members of the Committee, retiring by rotation, also be re-elected, viz., Messrs. B. C. Fox, E. W. Holland, G. C. Kentish, H. W. Parker, E. Pitts, E. C. Roe, T. H. Winney, and Thomas Bishop; and that the following gentlemen be elected as new members of the Committee, viz., Messrs. G. C. Harrison, C. Brown, and Wm. Miles.

This was seconded by Mr. Edwin Brooks, Treasurer, and carried unanimously, and after some other business the meeting terminated with the announcement that the annual dinner will be held on Tuesday, March 20.

Illustrations.

NEW MAIRIE, LILAS, PARIS.

THIS building, in one of the suburban districts to the north-east of Paris, was completed two or three years ago from the plans of M. Paul Héneux, whose design was selected in a competition.

The porte-cochère in front is specially intended for the convenience of wedding parties alighting. There is a large vestibule, and beyond it a staircase giving access to the principal floor, with a quaintly-designed wrought-iron handrail, in which lilacs are introduced, in reference to the name of the place. The Salle des Mariages is on the first floor, with a large gallery round it. In the service-court behind the main building are a fire-engine house and lodgings for the firemen. The attic story contains a large library and the necessary lodgings for resident officials.

The decoration, both carved and painted, is a good deal taken from the shrub which abounds there, and from which the district takes its name. The lilac appears everywhere, and in all kinds of forms,—in garlands, in grilles, as a diaper, &c., the designs formed from it being very graceful in many cases. In the Salle des Mariages it combines with the orange in a wall decoration. The lilac appears in the armorial bearings of the town, of which we give an illustration, with its motto, "J'étais fleur, je suis cité."

The building is in Enville stone for the basement, and Méry-sur-Oise stone in the upper portions. The columns of the porch are in polished Ancy-le-franc stone, and the steps of the staircase of Pierre d'Echaillon. The floors

are all of iron construction, and the roofs are of timber and covered with lead. The total cost has been about 400,000 francs.

PULPIT, ST. ALBAN'S CATHEDRAL.

THE pulpit of which we give an illustration was executed from the designs of Mr. J. Oldrid Scott by Mr. Miskin, of St. Alban's, the figures and carving being by Mr. Brindley.

A large part of the pulpit is of Purbeck marble, the rest of fine Chilmark stone. It was presented to St. Alban's Cathedral by the Freemasons of England.

THE ROMAN THEATRE, ARLES.

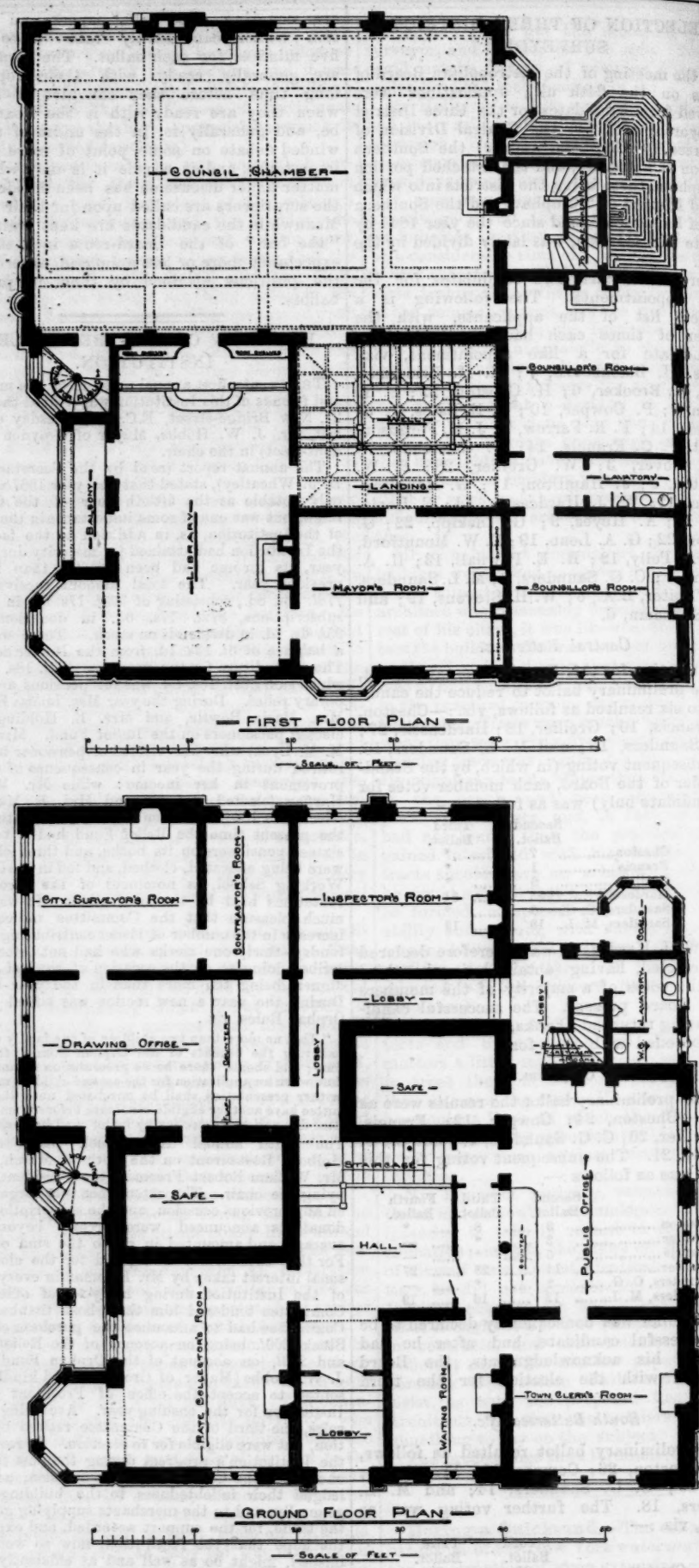
THE view of the remains of the Roman theatre at Arles is from a water-colour drawing by Mr. A. Needham Wilson.

The remains seem to indicate an idea on the part of the builders of producing variety of effect by the contrast of plain stone and coloured marble columns, apparently not accord- to any symmetrical scheme.

MUNICIPAL BUILDINGS, CHRISTCHURCH, NEW ZEALAND.

THESE buildings were completed last year from the designs of Mr. J. Hurst Seager. They appear to have been very carefully carried out in all their practical details, and to have given great satisfaction.

Figure of "Concord," for the Municipal Buildings, Christchurch, New Zealand. — Mr. G. Frampton, Sculptor.



New Municipal Buildings, Christchurch, New Zealand.

The woodwork is all of the native rimu wood, covered with a coating of uncoloured oil, leaving the natural grain of the wood to show. All the fittings were made by local manufacturers. The wrought-iron gates, designed by the architect, were made by Messrs Scott Brothers, and were the first wrought gates made in the town. The grates were from Mr. Crompton's Crown Ironworks. The glazing was by Messrs. Taylor & Oakey, from designs by the architect, and the furniture was made by Mr. Fuhrmann.

The two sculptured figures, of one of which, representing "Concord," we give an illustration (the companion figure represents "Industry"), were modelled by Mr. G. Frampton, of London. Mr. Seager, we believe, received his professional education in London, and this was his first important work in the colonial city. A local paper records that "the architect seems to have spared no pains, and to have exhausted his ingenuity in devising means to make this, his first public work, worthy of the city and a credit to himself."

ST. CHAD'S CHURCH, EVERTON, LIVERPOOL.

THIS church was erected in 1885, and provides accommodation for 700 people in the nave and aisles, whilst the chancel has stalls for forty choirmen and boys. The site was a difficult one, sloping about 8 ft. transversely

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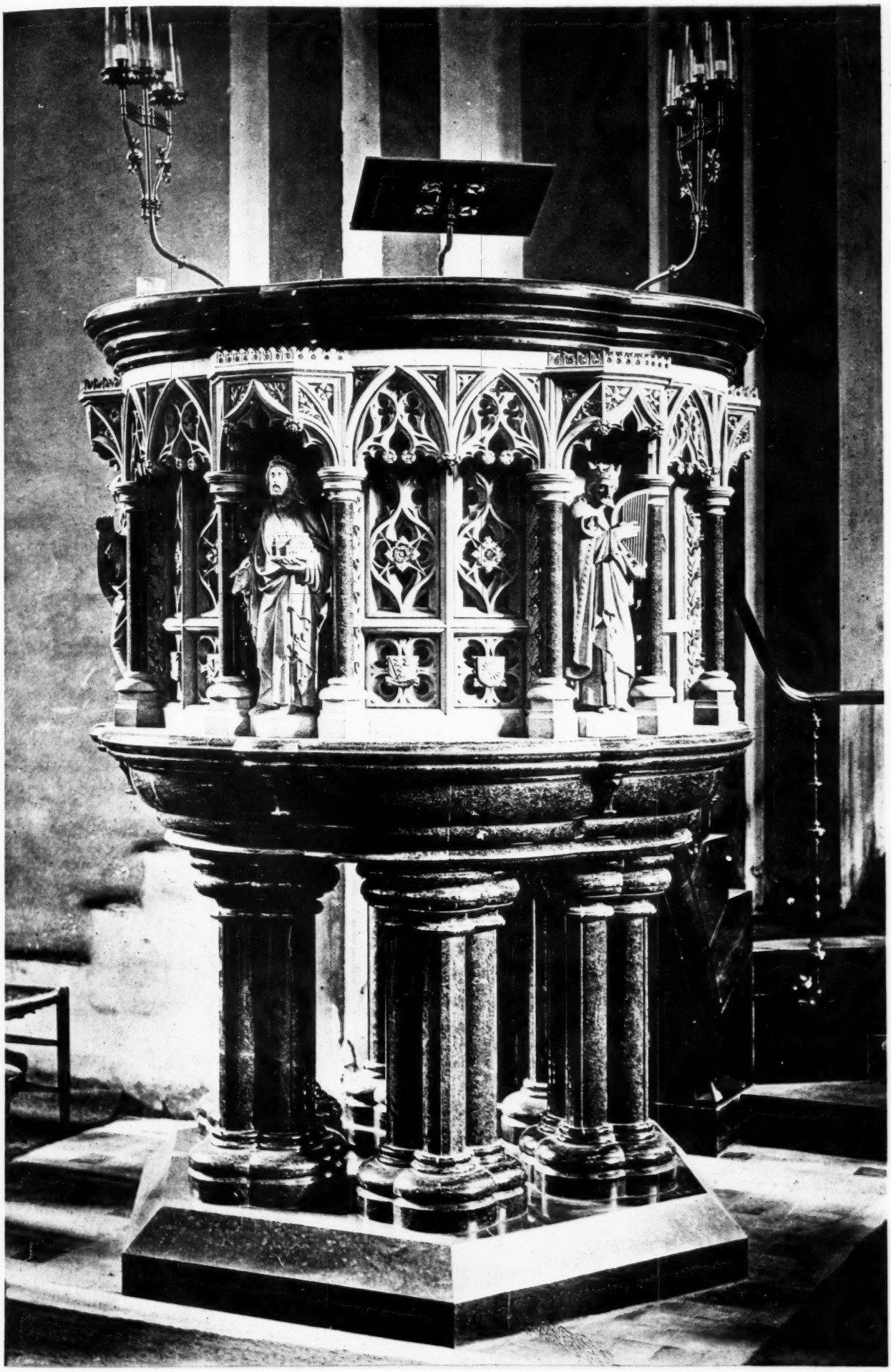
NEW MAIRIE LILAS, PARIS.—M. Paul Héneux, Architect.



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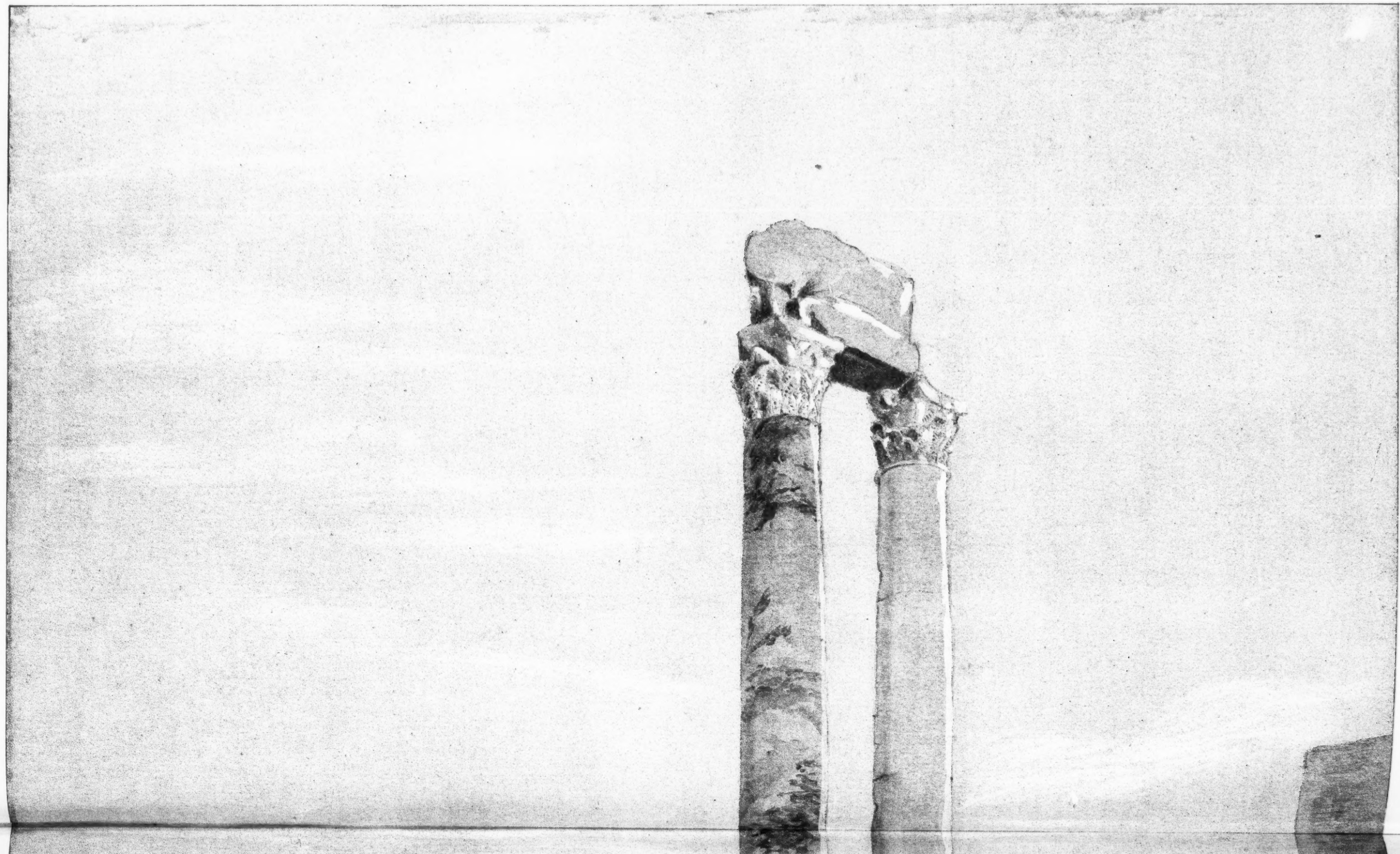
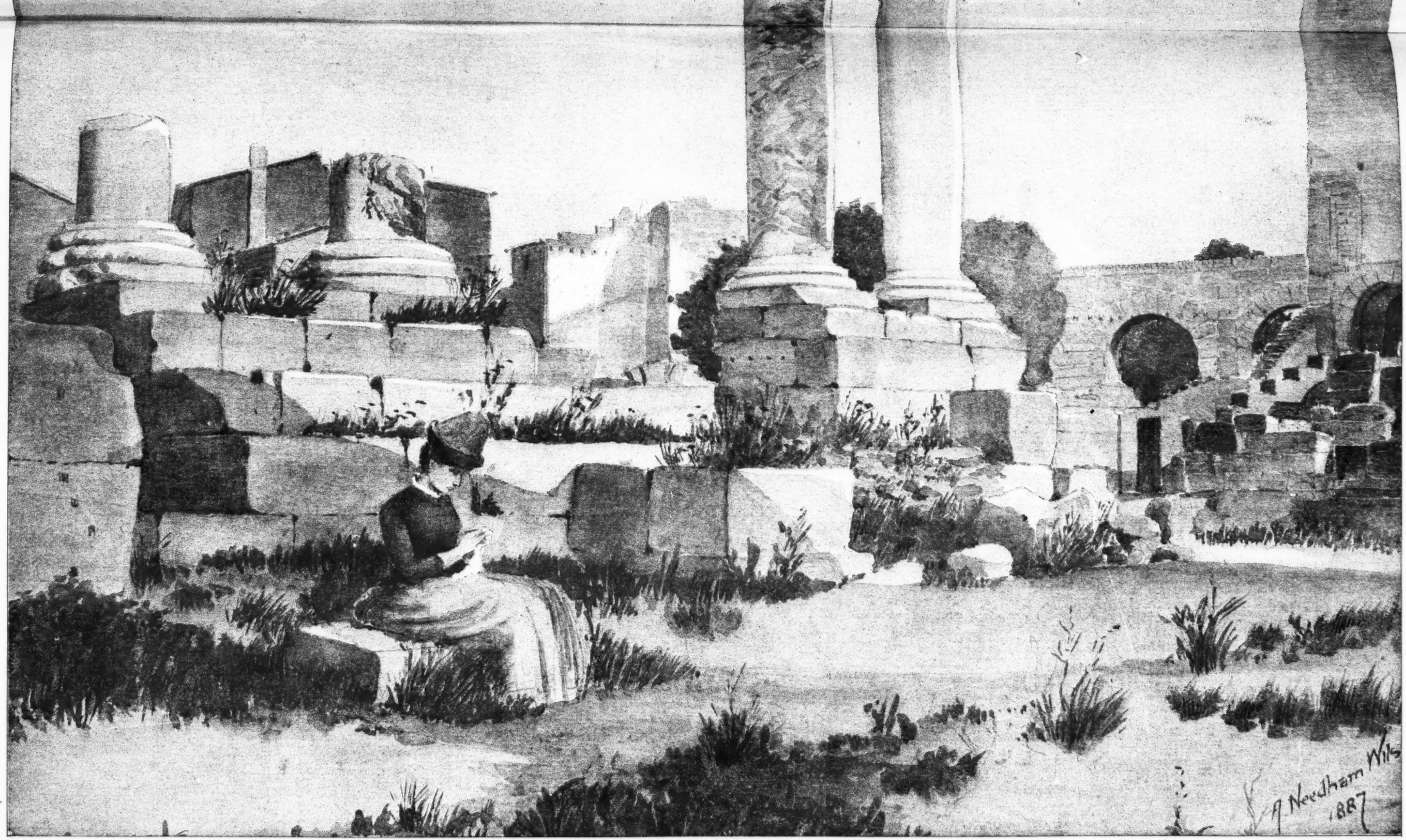
PULPIT, ST. ALBANS CATHEDRAL.—Designed by Mr J. Oldred Scott, F.R.I.B.A.





"INK-PHOTO," SPRAGUE & Co., 22, MARTINS LANE, CANNON ST., LONDON, E.C.

THE ROMAN THEATRE, ARLES.—From a Sketch by Mr. A. Needham Wilson, Architect.

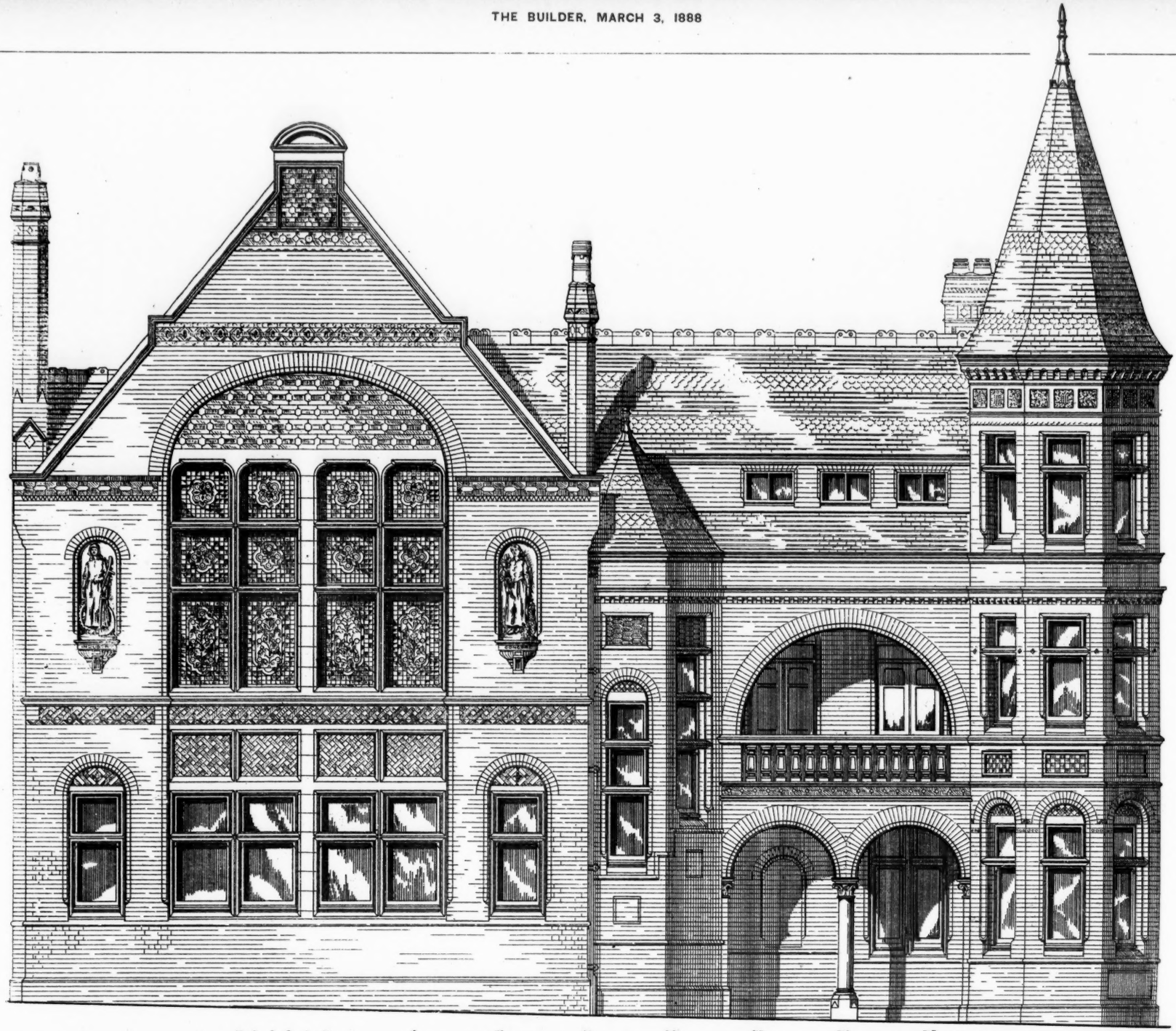


PHOTO-LITHO. SPRAGUE & Co. 28, MARTINS LANE, CANNON ST. LONDON, E.C.

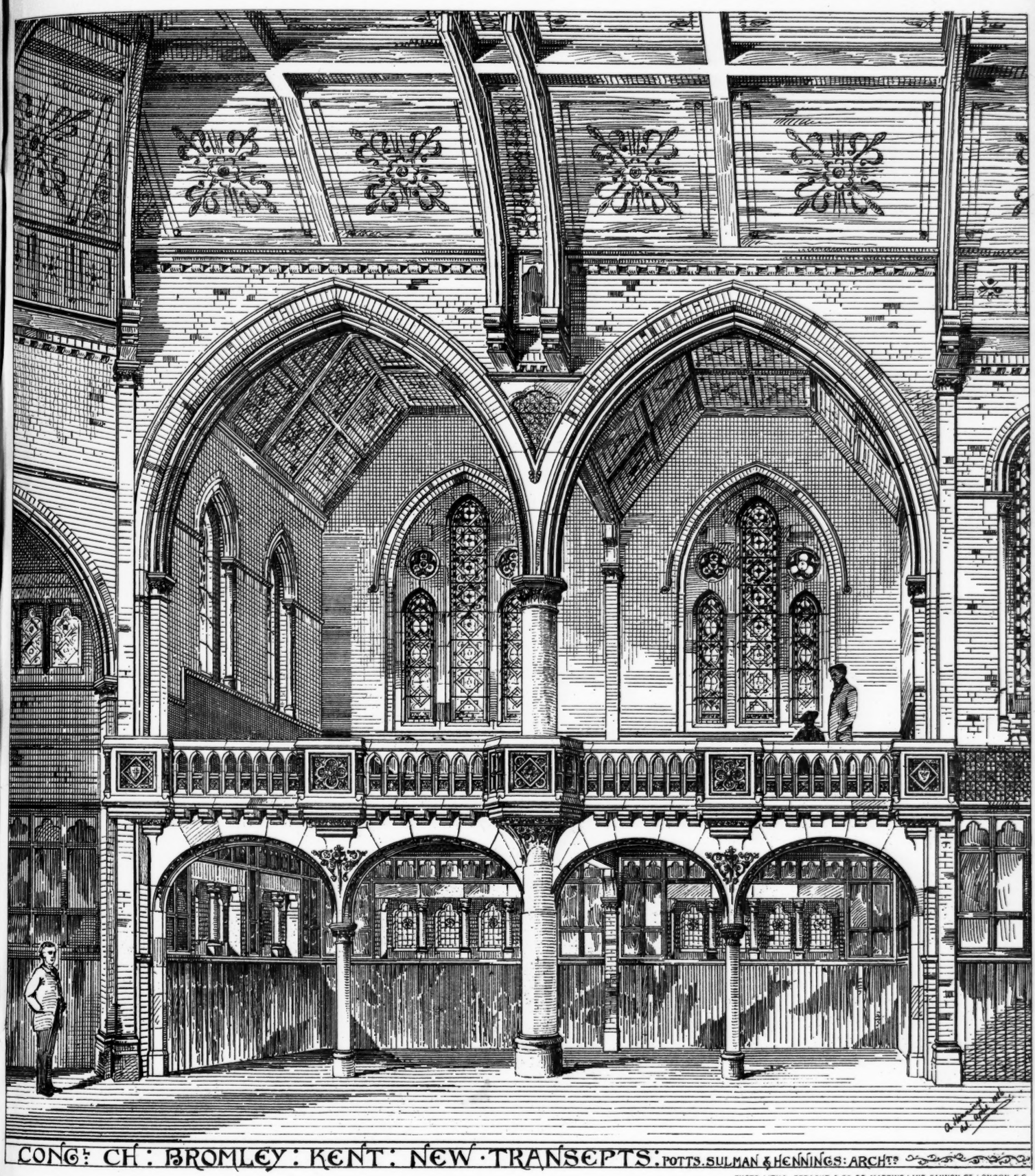
THE NEW MUNICIPAL BUILDINGS, CHRISTCHURCH, NEW ZEALAND,—Mr. J. Hurst Seager. A.R.I.B.A., Architect.

PHOTO-LITHO, SPRAGUE & Co. 22, MARTINS LANE, CANNON ST. LONDON, E.C.

THE NEW MUNICIPAL BUILDINGS, CHRISTCHURCH, NEW ZEALAND,—Mr. J. Hurst Seager. A.R.I.B.A., Architect.

PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON.

CHURCH OF ST. CHAD, EVERTON, LIVERPOOL.—Messrs. Potts, Sulman & Hennings, Architects.



CONG.L CH: BROMLEY: KENT: NEW TRANSEPTS: POTTS, SULMAN & HENNINGS: ARCH.TS

PHOTO-LITHO, SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

and 6 ft. longitudinally, making it necessary to provide a flight of steps at the main entrance, enclosed at present by a deep porch, but to be covered in future by the tower. A morning chapel adjoins the chancel, and has a separate entrance and warming apparatus to enable it to be used for daily service. On the opposite side is a large organ-chamber and three vestries, two for clergy and one for choir. The building is faced within and without with Ruabon red bricks; the internal stonework is of Bath, the external of Runcorn stone; roofs slated. Internally, the roof of the nave is a pointed barrel vault, with moulded principals dividiug the bays, whilst the chancel has a panelled roof, with deeply-moulded ribs. The works were carried out by Mr. H. Yates, of Everton, at a cost of 5,960*l.* (without tower, but including morning chapel, vestries, lighting, heating, boundary railing, &c.) from the designs and under the superintendence of Messrs. Potts, Sulman, & Hennings, architects, London.

BROMLEY CONGREGATIONAL CHURCH: NEW TRANSEPTS.

THE additions partly shown by the accompanying view were necessary, owing to the greatly increased congregation. They consist of double transepts on either side,—those on the west shallow, the ground being limited, and those on the east side deep, as shown in the view, giving extra seating accommodation for 300 persons. Messrs. Arnaud & Son, of Bromley, carried out the work. The coloured decorations were by Messrs. Haywards, of Newgate-street, and the carving by Mr. G. Arrowsmith, of Brixton. The total cost of the whole was 3,880*l.* The architects were Messrs. Potts, Sulman, & Hennings.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—The sixth ordinary meeting of this Association for the current session was held at Queen's College on Tuesday evening last. The Vice-President (Mr. W. Doubleday) took the chair. Three gentlemen were nominated for membership. Mr. G. Brown was elected a member of the Association. A paper was read by Mr. J. W. Tonks on "Gold and Silver Keys." The paper was illustrated by many excellent designs for keys. A vote of thanks, proposed by Mr. Doubleday, and supported by Messrs. Cotton, Ward, and Victor Scruton (Hon. Sec.), was heartily accorded the lecturer for his interesting paper, and after a response from that gentleman the meeting terminated.

Sheffield Society of Architects and Surveyors. A special meeting of this society was held on the 23rd ult. to discuss the question of the "Legal Registration of Architects and Surveyors." There was a large attendance of members. Mr. E. M. Gibbs moved "That the legal registration of architects and surveyors is desirable." This was seconded by Mr. E. M'Dougall, and carried *nem. con.* Mr. W. F. Hemsoll moved the following resolution, which was seconded by Mr. G. H. Genn:—"That we, the Sheffield Society of Architects and Surveyors, petition Parliament in favour of the Bill entitled 'A Bill to arrange for the Qualifications and Registration of Architects, Engineers, and Surveyors,' and copies thereof sent to the members of Parliament for Sheffield and neighbourhood, and that they be asked to support the Bill." Mr. C. Hadfield moved as an amendment to the above, "That the hon. sec. be instructed to write to the R.I.B.A. and Surveyors' Institute, asking for their opinion and further information on the question, and forwarding them a copy of Mr. Gibbs's resolution." This was seconded by Mr. J. D. Wightman, and a long discussion ensued. Mr. Hemsoll having replied on the discussion, the amendment was put and lost, Mr. Hemsoll's resolution being adopted.

Edinburgh Architectural Association. — At the meeting of this Association on the 23rd ult., Professor Blackie delivered a lecture before the members entitled "The Philosophy of Architecture." On Saturday afternoon last the members visited Inveresk and vicinity. Mr. Archibald Macpherson was prevented by illness from conducting the party, but his notes were read in his absence. The first building visited was Inveresk Lodge, where General Hope received the excursionists. The eastern portion of the lodge, which is of earlier date than the other parts, was modernised about fifty years ago by an English gentleman who occupied the house for a considerable time. Attention was drawn to the panelling of the hall, which is of oak, and is probably as old as the house, which dates from about the end of the seventeenth century. The house has long been in the possession of the Wedderburn family. Halkerston House was next visited. This house is probably about fifty years later in date than Inveresk Lodge, its general disposition betokening a further advance in the adoption of Classic ideas. The party, after viewing the Manor House, proceeded to Brunstane House, which is jointly occupied by Professor Wallace and Mr. Park, farmer. On a doorway here are found the arms of the Lauderdale family, with the date 1639.

THE PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS.

ANNUAL DINNER.

THE annual dinner of this excellent Institution was held at the Holborn Restaurant on Saturday evening last, Mr. Thomas Blashill, F.R.I.B.A., Superintending Architect of the Metropolitan Board of Works, occupying the chair, supported by Mr. Banister Fletcher, Mr. F. J. Dove, Mr. J. M. Burt, Mr. S. Knight, and several other visitors, as well as by a large number of members, the total number of gentlemen sitting down to table being 268. The loyal toasts having been duly honoured (Colonel Banister Fletcher appropriately responding for the "Army, Navy, and Volunteers"),

The Chairman proposed the toast of the evening, "The Provident Institution of Builders' Foremen and Clerks of Works." He said that although he hoped that in the future, in some more ideal conditions of existence than now obtained, such institutions would be unnecessary, such a period had not yet arrived, and therefore they must continue to feel sympathy for a society of men who endeavoured to help themselves, like the builders' foremen and clerks of works. He felt sure that all architects and builders must feel the greatest sympathy for such a class of men. The Institution was one which was supported by subscriptions and donations, and it afforded assistance to those in ill health or old age, and also to widows of members who needed help; and this being most useful and necessary, he trusted that there would be a hearty response that evening to their appeal. One useful feature of the Institution was its library, and he hoped and trusted that it would be kept up. It appeared strange to him that free public libraries were provided in many provincial towns, and yet there were so few in London; he therefore thought if this feature remained, the Institution would prove a very useful one. In conclusion, he expressed the hope that an Institution so meritorious and so well conducted would be well supported by those who had it in their power to help it, and he trusted that the membership would be largely increased, for it appeared to him there was plenty of scope for enlargement (hear, hear).

The toast, which was well received, was responded to by the secretary, Mr. J. W. H. Bedford, who stated that during the forty-six years the Institution had been established, it had paid something like 6,500*l.* to the widows and orphans in pensions. The former severe restrictions and limitations regarding the admission of members had been removed, and candidates had only to show that they were competent men, and they would be admitted.

The next toast was "The Governor and Trustees," proposed by Mr. Philip Cheek, who said he had to propose the toast of three well-known men in the building trade of London: the Governor (Mr. George Plucknett, J.P.), Mr. F. J. Dove, who was, he thought, one of the oldest subscribers to the Institution; and last, but not least, Mr. Scrivener.

Mr. Dove, one of the Trustees, in responding, spoke in eulogistic terms of Mr. Plucknett, the Governor. He said the Trustees were perfectly satisfied with the management of the Institution by the executive, and he thought there were few societies of the kind where the expenses of management were so insignificant in proportion to the outlay.

Mr. G. Groome, in a humorous speech, next proposed the "Donors and Honorary Subscribers," coupled with the name of Mr. Thomas Stirling, who briefly replied.

The next toast was "The Architects and Surveyors," proposed by Mr. F. J. Dove, who said he was sure that no body of men could be drawn together who were better acquainted with the architects than those brought together that evening. There were very many architects for whom they entertained the highest admiration, and some whom they did not admire so much (laughter). He considered that the steps some of them were taking to obtain a qualification by Act of Parliament would increase the number of incompetent men instead of lessening it, and he thought that builders, builders' foremen, and clerks of the works should endeavour to have a voice in the matter. A man was not an architect in the proper sense of the word unless he was a practical man as well as an artist, and it was his opinion that many of the younger men in the architectural profession paid more attention to artistic than to practical matters; some of these practitioners were most impatient of being corrected in practical matters by the builders. It was, however, a great pleasure to have so thoroughly practical a man as the Chairman presiding over them that evening. It was always a great pleasure for builders' foremen and clerks of works to work with gentlemen who appreciated the value of their work.

Mr. Samuel Knight, F.R.I.B.A., in responding on behalf of the architects, said that although in that Institution there was no distinction between the builder's foreman and the clerk of works, yet the builder's foreman had, as a rule, far more work to do than the clerk of works. The latter title was, however, far more ancient than that of "architect," as William of Wykeham was spoken of in old records as "Clerk of Works," and Sir Christopher Wren was called the "Superintendent of the Works." Inigo Jones occupied a similar post and enjoyed the same title. He (Mr. Knight) fully endorsed Mr. Dove's remarks as to the desirability and necessity for the architect being a practical man, and he did not think an architect was deserving of the name unless he had had some practical experience of work. The public were easily carried away by externals, and brick was often used in situations where stone would be much better constructively, and would cost only about one-third as much. In his opinion, it was advisable that when a diploma was granted to architects an examination in practical knowledge of construction should be made an essential test. He also thought that it might be advisable that the clerk of works should have a diploma or certificate also, to signify that he was able and capable of doing his work. He had much satisfaction in observing from the balance-sheet that the working expenditure of the Institution had been kept down to a *minimum*; and it seemed to him that the officers and members had all worked *con amore*. He concluded by hoping that some efforts would be made to bring the Institution more prominently before the architectural profession.

The toast of "The Builders" was then proposed by Mr. J. Stapleton, who said he thought the builders were more proficient in their work than they were thirty years ago. He thanked the Builders' Society for their kind assistance to the builders' foremen and clerks of works.

Mr. John Mowlem Burt (of the firm of John Mowlem & Co.), in replying to the toast, said that mention had been made of the incompetency of some architects, and he had been compelled more than once to say to an inexperienced architect, "Do you think this is right?" He was bound to say that generally such questions were respectfully considered by the architects, who, as a rule, were very glad to avail themselves of anything that was pointed out to them; but he had met with one architect, who was proposing to do some "skylarking" at a very great elevation, who only consented to modify his views when the contractors protested against incurring any responsibility for the proposed work.

Mr. Banister Fletcher next proposed the toast of "The Press," coupled with the name of the representative of the *Builder*, who acknowledged the compliment.

Mr. Mead proposed "The Visitors," coupled with the name of Mr. Alex. Ritchie (Steven Bros. & Co.), who briefly replied. The toast of "The Chairman," was next proposed by Mr. J. Merifield (Treasurer), and the Chairman having briefly replied, the last toast of the evening, "The Officers of the Institution," was proposed by Mr. H. Horner (of the firm of Ashby & Horner). Mr. G. Ross, in replying, said the officers had tried to work in a generous and fair manner, and to give what benefit they could to those of their members who had not been fortunate in life.

During the evening subscriptions and donations to the amount of 62*l.* 3*s.* were announced. The musical entertainment of the evening was very kindly provided by Mr. Philip Cheek.

ACOUSTIC MATERIAL.

SIR,—The question recently raised as to the relative merits of a flooring of wood with hollow space beneath, and of a solid platform of concrete, for acoustic purposes, seems to grow in interest, if not in importance, from the numerous views expressed by those who have taken part in the discussion upon theatre construction.

Distinct hearing in a given space depends upon so many circumstances that it might not always be easy to decide definitely whether this or that may be the real cause of a given result.

I must admit that my view as to the superiority of solid concrete over a boarded floor for such purposes may be fairly regarded as open to question, but I do not think that (according to a footnote in the *Builder* (p. 101), commenting on what I said at the Institute) it is quite correct to set it down as "totally at variance with all musical experience and theory"; still less do I think it a reasonable analogy to suggest

the comparison between "a violin made of fibrous plaster and a wooden one." I admit that formerly there was little or no question amongst musicians and others as to the use of wood for platforms for organs and orchestras, as well as for singing and speaking. It assisted in producing a volume of sound.

But there are organ-builders now who seem to have found that the solid concrete is superior for purposes of reflecting and transmitting sound to a distance with clearness and precision. In any case it cannot be disputed that the noise of feet or any other sound on a boarded floor hollow beneath adds very greatly to the difficulty of hearing anything distinctly at a distance in the way of singing or speaking, or of delicate cadences in music. The vibrations of the varied tones of sound neutralise each other and check their flow. And this is the same in the transmission of a volume of sound in music. The music may be loud enough to drown any such subsidiary noises; but with a solid floor such noises have but little effect. In the boarded floor there is, doubtless, what is called a fuller sound, arising from the greater fusion of the various vibrations. This fusion greatly interferes with their direct transmission to the distance, and, in fact, produces a confusion of sound.

During nearly thirty years I again and again endeavoured to get the Committee of Council on Education to allow the use of a solid wood block paving, but never succeeded. But at the present day there are, I suppose, but few teachers who have experienced a solid pavement in their schools would ask for a hollow boarded floor as required by that committee. And I contend always that the solid floor is better, but I emphatically deny that the resonance of a concrete floor is in the very slightest degree dependent upon the air-space interstices found in the concrete, as suggested by one speaker at the meeting. For the more solid the concrete the better; and, indeed, good firmly bedded Yorkshire stone is even still better than concrete. Merely to assert that it is, and must be, really the best would be but begging the whole question at issue; and I must give some sufficient support to any contention,—which I can do both by unprejudiced testimony and by the reason of the thing. But first I must say a word as to the dulness of the resonance in a boarded floor as compared with concrete. This arises apparently from the inferior resistance and elasticity to be found in the wood. Some may be inclined to smile at the notion that the wood is inferior in this respect. Now, in speaking of wood I do not refer to the thin, fine, close-grained wood, with its hardened surface and fine polish, of which violins are made, but of the ordinary flooring-boards in the English market. Nor do I, in speaking of floors, refer to finely-polished oak, mahogany, rosewood, or teak, but to ordinary deal. I need hardly allude to the effect of the wood rather than plaster for the production of the sound in the violin. We are concerned here only with a surface for the reflection and pure transmission of sounds when produced; and not with an instrument for the production of musical tones. I assume for my purpose that the reflecting power of the surface or substance would be generally of the same value for sound as for other purposes. Let us compare two extreme substances, ivory and lead. The force of rebound from ivory is infinitely greater than that from lead. The ivory is one of the least compressible and most elastic of known substances. The lead is of the very opposite nature. So it is with stone as compared with soft-grained wood, notwithstanding the wonderfully-vibrating power in the long grain of wood. And it is the same when comparing fibrous plaster and a common deal board. But if the deal board be solidly bedded in fibrous plaster the vibrations of sound will be reflected instead of being absorbed and transmitted to the other side of the material.

Again, if the proportions and form of an interior be such as to induce an echo, the nature of the echo greatly depends upon the reflecting surfaces. If these be of stone or hard plaster the notes of the echo are clear and sharp, if of wood they are confused and indistinct. In like manner the best natural echo is from the face of a perpendicular cliff of stone. Then, for practical experience, I would quote the case of the new Parochial Mission Room at St. Mark's, Battersea Rise, recently opened with speeches and a musical performance. The chief performer, knowing nothing of the contest which had taken place as to the construction of the platform, voluntarily expressed himself as very much struck with the successful result of the building acoustically. The floor of the platform was constructed, like that of the room itself, with wood-block paving on solid concrete, and an attempt had been made to change it for hollow boarding for the sake of the sound. The interior surface of the walls was finished in brick, the rafters of the open timber roof being plastered. If not correct in my conclusions I hope the whole matter will be more fully worked out in relation to the true nature of the various substances as affecting the transmission of sound.

WM. WHITE, F.S.A.

*** It is not only a question of the transmission and reflection, but of the re-inforcing of sound, by the neighbourhood of substances which will vibrate in consonance with the instruments. The relation of an orchestra construction to the band is analogous to the relation of the body of the violin to the strings. The fine tone of an old violin is not due to the strings, which have been broken and changed a hundred times, but to the vibration of the wood in consonance with them. We can give Mr. White a piece of very practical testimony from a singer, which came under our notice when arranging the performance of an oratorio in a church. It was proposed that the solo singers should leave the stalls, each in their turn, and sing from the choir step, facing the middle aisle. "Then," said the principal soprano, "I hope you will have a small staging of boards, even if it is only raised three inches, for *no one can sing off stone*."—ED.

MAHOMETAN ARCHITECTURE.

SIR,—The conclusion of Mr. Phené Spiers's lecture [pp. 103, 119, *ante*] is even more interesting and important than the beginning, though the first part was interesting enough.

When I made, some ten years ago, a hurried trip into Moorish Spain, I had the opportunity of seeing many old icicle capitals and corbels of wood that had been removed from ruins, and also some in place; all these were composed of the seven pieces drawn by Owen Jones, pinned together. Had one not known that this was a late development, one must have attributed the invention to accident. The whole thing looked as if stray pieces of wood of different lengths, the ends of which had been moulded with different mouldings, had been put together for making Tunbridge ware on a large scale, and that the fanciful shapes the ends made, had suggested the icicle work.

When in Cairo, long antecedent to this, I had neither time nor opportunity to investigate the stone icicle work, which Owen Jones states was the attempt to reproduce successive layers of egg and tongue.

In "L'Art Arabe" of Prisse d'Avennes, the invention looks as if it were derived from a succession of niches superposed, which form the pendentives of the dome in front of the Kibla, at the Mosque of Ahmed Ibn Touloun, built by the Christian Coptic architect.

Until we become as familiar with geometry as the Mahometans were, we shall never comprehend how such a dome as that over the Hall of the Bark at the Alhambra was designed, which is maddening to look at, and might even now be taken for the work of magicians.

G. AITCHISON.

"PRACTICAL EDUCATION IN ART."

SIR,—I am sincerely grateful and gratified that the *Builder* accords, in its number of Feb. 25, such cordial commendation to my book on "Practical Education." There are in it, however, certain objections to certain views attributed to me, in which I would concur if I did not think that they are already met in my book. These are, firstly, Where is the money to come from to pay for hand-work? Will children earn a livelihood by purchasing each other's work? This I have met by stating clearly enough that people instead of buying machinery-made ornaments will purchase the hand-made, pointing out the fact that really artistic hand-made brass work is now made as cheaply by the pupils of the Home Arts and Industries Association as the machinery-stamped trash of the shops. Nor do I say anything whatever to the effect that every child in existence shall be employed in making and selling objects. I only think that there is a possible employment for many now idle should hand-work in decoration take the place of machinery, which only produces imitations.

I do not pretend to give all my views as to design in "Practical Education." In my "Manual of Design," published in New York, in an article on design in the *Art Journal*, and in a work now in the press, I have carefully pointed out that while symmetry and balance, and even beauty, may be obtained by *doubling* a pattern (in which the leading writers of the time agree with me), the cold and formal result should be avoided by variation. In my New York Manual I have illustrated this very clearly with designs.

I do not at all propose to teach drawing with cups and coins, or by stencilling. What I say is that one can by so doing give very young children rudimentary ideas of what design is,—how simple sprigs may be combined into a design,—and to familiarise them with holding a pencil. This is only *preparing* infants to learn to design and draw. I have taught nearly 2,000 children, and I have found that with very young pupils, and even with elder ones who are dull, this merely mechanical beginning is an admirable one.

All that is said as regards flower-painting is exactly in substance what I have also declared. I say, "If you would keep a girl from becoming an artist set her *at once* at flower-painting." But I immediately add that she should not paint flowers till she has studied design and monochrome. And further on I add, "Here I would emphatically declare, for the benefit of certain critics, that nothing can be alleged against flower-painting as a branch of art save its great abuse by ignorant and untrained amateurs." Surely the *Builder* does not hold that ignorant and untrained pupils should be set at flower-painting!

If there is any subject which I have carefully considered in design, it is studying the special qualities and capabilities of material. This I am charged with overlooking. A design for embroidery is not adapted to brass, &c., although a man who has executed hundreds, perhaps thousands, of designs for perhaps twenty different arts, knows that a pupil who is beyond the rudiments can, in most cases, adapt any design to any material. One of the first ideas which induced me to insist on design as a basis for the minor arts was that the pupil would thus be enabled to always adapt the pattern for the material. I have taught and written so much and so often on this subject, that the accusation of neglecting it strikes as almost comic in the extremity of its injustice. But the effective answer to these minor criticisms is that "Practical Education" does not pretend in the least to teach design or a number of minor arts. It only aims at giving *a very general idea* of a system which is now successfully pursued by thousands of pupils in the public schools of Philadelphia and New York. The book is, in fact, the introduction to a series of manuals of arts and industries, in which it will be clearly shown that every one of the defects attributed to my work are evils which I have earnestly combated.

CHARLES G. LELAND.

*** We are glad to find that Mr. Leland does not mean what he appears to mean in some cases. On page 70 of his book he certainly says "a design for sheet brass may also be used for flat carving," which would naturally lead one to suppose that he is not sufficiently considering the difference of material and method. We think he does lay too much stress on repetition of parts; he even suggests the employment of repetition by a kind of kaleidoscope for producing design. We think that a dangerous suggestion, and we maintain our objection to teaching even the youngest child to make representations of grapes by drawing circles round a coin. It is beginning wrong. We hope Mr. Leland will withdraw that from future editions of his useful and suggestive book.—ED.

STOCK-BOOK FOR THE TIMBER TRADE.

SIR,—As subscribers to your paper since 1852 or 1853, we write to ask if you, or any of your readers, can furnish us with information as to the simplest method of stock-book for the timber trade, showing the various sizes and qualities separately.

Oundle, Feb. 24. GEO. SIDDONS & SONS.

ENGLISH *v.* BELGIAN JOISTS.

SIR,—Every now and again we hear it asked, How is it that our English ironworks cannot compete with those of Belgium, France, and Germany in the manufacture of rolled joists? Well, of course, two important reasons, to a considerable extent, account for it, viz., that the Continental workmen of all grades work longer hours and are content with lesser wages than the British workman. I may be contradicted as to the correctness of the word "content," because it will be alleged that they are not content, but have to put up with a low wage, and are agitating from time to time for an increase; be that as it may, the fact still remains. And also that the masters are similarly content with a much less return upon their investment. Another, and a very important, reason is that the present English makers, with one or two exceptions, cannot turn out joists equal to the foreign ones, either in straightness, sharpness, or uniformity and prettiness of section; somehow or other they have not as yet, and cannot get hold of, the "knack" in the manufacture, and the consequence is that no sane man, who impartially compares English with Belgian joists, would think of using the former; and therefore, unless there comes about a reduction in wages with a vast improvement in make, on one side, or a levelling-up, without any deterioration, on the other, it is evident that the existing superiority of Belgian joists will be maintained, and the foreign makers together will continue to monopolise this branch of the iron trade.

I have had some twenty-three years' experience with Belgian joists and girders, and have used many thousands of tons, but I have never met with any to equal a parcel of some fifty English steel joists brought under my notice professionally during the past week, and it is on this account I beg to trouble you with my letter for the purpose of putting architects and engineers on their guard.

These joists have been fairly condemned, because there is scarcely a straight foot in their length, laterally or flange-wise, being wavy all along; the sides of the flanges are knife-edged and jagged, and the steel bad; in fact, the joists are absolutely unuseable without undergoing a costly process of cold straightening in a press, and even then bad will be the best.

As doubts were entertained as to the strength, it was suggested that a 6-in. by 2-in. section should be tested against a 6-in. by 2-in. equivalent Belgian section, which, being done, gave the following result:—

BELGIAN IRON, 6½ in. × 2 in. I. × 13 ft. SPAN.

			ton	cwt.	qr.	lb.	
Deflected	3/16	in. with a load of	0	8	3	20	on centre.
,,	1/4	,, ,,	0	16	3	24	,,
,,	1/2	,, ,,	1	5	0	0	,,
,,	5/8	,, ,,	1	13	0	4	,,
,,	3/4	,, ,,	2	2	1	18	,,

And came back to its original position when the load was removed.

ENGLISH STEEL, 6 in. × 2 in. I. × 13 in. SPAN.

			ton	cwt.	qr.	lb.	
Deflected	1/4	in. with a load of	0	8	3	20	on centre.
,,	5/16	,, ,,	0	16	3	24	,,
,,	3/4	,, ,,	1	5	0	0	,,
,,	15/16	,, ,,	1	13	0	4	,,
,,	1 3/16	,, ,,	2	2	1	18	,,

Giving a permanent set of 1-16th in. when the load was removed.

The only set-off, if it can be called one, to the bad make of the steel joists is their extreme elasticity, rendering them capable of deflecting 1 3/16 in. without showing more than 1/16-in. permanent set; and with regard to price I may say that they are, strength for strength, about 5 per cent. dearer than ordinary good Belgian.

In the face of these results, I think further comment is superfluous, but although it will be unpleasant reading to many, the truth may as well come out, and what I have stated are just the bare facts.

ARCHIBALD D. DAWNAY, A.M.Inst.C.E.

ARCHITECTS AND SCHOOL BOARDS.

SIR,—Referring to a letter on this subject, p. 89, *ante*, most architects take pains to get the method of payment of their charges put into writing as a deed, and sealed with the School Board's seal in every case,—unless they choose to run the risk of doing work, and doing without pay. I should like to know the exact state of the case, and so no doubt would many other members of the profession. My impression was that it had been recently held in a Superior Court, that an architect was *an officer of the Board* appointed for a special service on terms agreed upon; and that the record prescribed by the third schedule of the Elementary Education Act, 1870, would be all that would be requisite. Clause 7 of the third schedule as to Proceedings of School Board runs thus:—

"The appointment of any officer of the Board may be made by a minute of the Board, signed by the chairman of the Board, and countersigned by the clerk (if any) of the Board, and any appointment so made *shall be as valid as if it were made under the seal of the Board.*"

The remuneration question is dealt with in Section 35 of the Act:—

"A School Board may appoint a clerk and a treasurer *and other necessary officers*, ... and may assign them such salaries or remuneration, if any, as they think fit, and may from time to time remove any of such officers," &c.

I am assured by friends in the profession that I must have dreamed as to the matter, and afterwards in waking hours mistaken a plausible argument for a Judge's ruling. I can hardly think my memory has played me so false, but I have not been able to lay my hand on the case I looked for, and therefore beg permission to ask about it in the *Builder*.

F.R.I.B.A.

"OILING STONE."

SIR,—In answer to "Monument" [p. 144, *ante*], oil will not prevent the damp from rising in stone that is imbedded in the ground. If "Monument" is using a hard York landing it will not require anything to preserve it, but it is best fixed in its natural state.

A coat (or two) of clear linseed oil will harden the surface and tend to preserve any stone fixed as a landing above the ground; but care must be taken to see that it is quite dry before oiling, as if any moisture is confined it will soon come out in black patches. It is also necessary for it to be perfectly clean, as the oil will show up every speck of dirt, which cannot be removed afterwards. A. A.

PROVINCIAL NEWS.

Cornwall. — We learn from the *Western Morning News* that a reredos has been put up in the old parish church at Boconnoc, about three miles from Lostwithiel, principally constructed of old Jacobean work. These materials all belong to the neighbourhood, and were sent by Lady Fortescue to Mr. Harry Hems's studio at Exeter, where they were cleaned and restored, and these formed the *motif* for the new work. More than one-half of the structure is constructed of the old oak. The whole of the face of the reredos is covered with the type of ornamentation so prevalent in this country towards the end of the sixteenth century. Mr. Hems has also placed a dado of similar character around the sanctuary. Satisfactory progress is being made with the movement in favour of a museum of mineralogy for Cornwall. The proposal has received the sanction of the Mining Association and Institute of Cornwall, and important donations of specimens have been promised. Impetus has been given to the movement by the fact that the Museum of Mineralogy and Geology will now be a memorial to the late Mr. Hunt, whose services in behalf of Cornish mining render him worthy of such an honour. It is a foregone conclusion that the museum will be at Redruth, several of the most important donations of minerals, notably that of the Redruth Literary and Scientific Association, having been made on condition that Redruth is the town chosen.

Kingsbridge, South Devon.—The property on the Little Rack Park Estate, leased under the Kingsbridge Feoffees, is now all completed, and makes a picturesque addition to the town, the whole being built in semi-detached pairs or single houses with well-planted gardens around them. The architect for the houses is Mr. John Wills, of Derby. Further building here may be expected before long, for we hear that the Great Western Railway Company has taken up the question of a railway to Kingsbridge, which is likely to be completed in another year.

Rotherham.—At a cost very nearly approaching 6,000*l.*, the Guardians of the Poor of the Rotherham Union have erected a new infirmary in connexion with the existing workhouse. The new building is most advantageously situated on land adjoining the workhouse buildings, and its elevated position gives it a very imposing effect. It consists of four large wards, also day-rooms, lying-in wards, kitchen, surgery, nurses' day and night rooms, laundry, washhouse, &c. The total length of the front is 235 ft. 6 in. Each ward is conveniently fitted up, bath-rooms, store-rooms, &c., having been provided. The accommodation is for fifty-two male and fifty-two female patients. Heat is furnished to the large wards by hot-air ventilating stoves, and to the smaller rooms by open fireplaces. The passages and corridors are well heated by a hot-water apparatus worked from the cellar. The building is of red sandstone from local quarries, the lining being of brick, also from Rotherham. Mr. G. B. Adams, of Rotherham, has been the contractor, the total amount of contract having been 5,384*l.* 6s. Mr. H. L. Tacon, of Rotherham, the Architect to the Board, is responsible for the designs, and the whole of the work has been carried out under his superintendence. The cost is covered by a special loan, and the furnishing, estimated at 650*l.*, is also being met in a similar way.

CHURCH-BUILDING NEWS.

Brighton.—We understand that an effort will be made by the new vicar, the Rev. J. J. Hannah, to carry out improvements and enlargements at St. Peter's, the parish church of Brighton. The exterior of the building, as it now stands, is a good specimen of Barry's early work in a starved version of Perpendicular. The interior has a very cold and depressing aspect, with meagre plaster vaulting and stringy detail. The plan, characteristic of the period, is without a chancel. In 1874 drawings were prepared by Mr. Somers Clarke, both for re-arranging the existing building and for enlarging it by the addition of a chancel, chancel aisles, vestries, &c., and the scheme of re-arrangement has, to a great extent, been effected. A movement is now to be initiated for carrying out the plans for enlargement, by which the building would take rank with some of our principal parish churches, and would be more suited to the position it now holds as the mother church of so large a place as Brighton.

Mobberley.—The *Manchester Courier* says that "a scheme is on foot for the restoration of the Parish Church of Mobberley, one of the most ancient and historically interesting character in Cheshire, which at present stands greatly in need of repairs. There was undoubtedly a church standing on the site of the present edifice so long ago as 1206. The chancel and three arches of the present church, with north and south aisles, were built late in the thirteenth century, and the roof of the church at that date was of one elevation. An enlargement was next made by adding one more arch to the nave, the aisles being lengthened to correspond. Late in the fifteenth century the nave roof was taken away, clearstory windows on the north side built, and the present nave roof placed upon them. Early in the sixteenth century the nave was again lengthened, the walls of the north and south aisles raised to their present height, new windows being inserted and the tower built. Thus the building of the church was accomplished in four separate periods, the whole time which elapsed from its commencement to its completion being from 250 to 300 years. During last year the opinions of two architects were taken as to the condition of the church. The gable at the east end of the chancel was found to be so much out of the perpendicular as to be in actual danger of falling. The roof of both the chancel and the nave required early attention, many of the beams and rafters being rotten,—the report on the later roof being even that it is not absolutely safe. The general condition of the walls of the church is good, with the exception of a few places where the stones could be easily removed, and replaced by new ones. A crack which exists in the east wall of the tower, and may be seen from outside, is not considered dangerous. The roof of the vestry is in need of immediate repairs, and has for some months been temporarily supported on the inside." The name of the architect consulted is not mentioned.

Roath, Cardiff.—The foundation-stone of the new St. Saviour's Church, situate in the parish of Roath, was recently laid by Lord Tredegar, who has given the site and 1,000*l.* towards the cost of erection. The church, which is a stone structure, will, according to the *Western Mail*, be of a mixed style of architecture, Gothic predominating, and its total cost will probably be between 6,000*l.* and 7,000*l.* The nave will be 66 ft. 9 in. long by 24 ft. wide, and there will be two side aisles, chancel, sacristy, vestry, &c. Accommodation will be provided for about 700 worshippers. The architects are Messrs. Bodley & Garner, of London; and the contractors Messrs. Stephens & Bastow, of Bristol.

Rotherham.—A new mission church at the Holmes, near Rotherham, Yorkshire, dedicated to St. Mark, was lately opened for service by the Archbishop of York. The building has been erected on a site given by Mr. G. W. Chambers, J.P., of the Clough, and is cruciform in shape, having nave, 53 ft. by 24 ft. 6 in., and transepts, 18 ft., wide; also chancel, 17 ft. 6 in. by 17 ft., with vestry or parish room, 26 ft. 3 in. by 15 ft. 6 in. Convenient entrances are arranged, the front one having a lobby, 6 ft

wide, and accommodation is provided for 270 persons. The materials used are local bricks and stone dressings. The church is heated by a hot-air apparatus supplied by Messrs. Wright Bros., of Sheffield, and is lighted by ornamental side gas-brackets and pendants. The total cost of the work has been 700*l.*, exclusive of internal fittings and furniture, the style selected being Early English. The whole has been carried out by Mr. Richard Snell, builder, of Rotherham, from the designs and under the superintendence of Mr. H. L. Tacon, architect, Rotherham.

Taxal.—The *Manchester Courier* says that it has been decided by the committee appointed to carry out the work of restoring the ancient parish church of St. James's, Taxal, just on the borders of Cheshire and Derbyshire, near Fermlee, to make the principal entrance through the tower (which is the oldest portion of the structure), so as to re-open the Early English arch which led into the nave, and which has been built up in the east wall of the tower (this had been the west porch for centuries); to replace the wood of the nave windows with stone mullions and tracery in character with the windows of the tower; to elevate both floor and roof of the chancel, and to erect in it an east window of proper design: also to erect an organ chapel for the choir and organ, to be brought from the West Gallery, and in that way gain about fifty additional seats. The Bishop of the diocese has given his sanction to the work, which is supported by Lord Egerton of Tatton, the Hon. Alan de Tatton Egerton, M.P., and others. Squire Jodrell's representatives have contributed 100*l.* towards the estimated cost (700*l.*) of the undertaking. The *Courier* does not mention the name of the architect who has been consulted.

Uddingston.—The parish church of Uddingston, near Glasgow, has recently been reopened, after extensive additions, carried out from the plans of Mr. John B. Wilson, A.R.I.B.A., Glasgow. The enlargement takes the form of a lengthening of the church, with the addition of transepts, providing in all over 470 additional sittings. A chancel and organ-chamber have also been added, the church hall and rooms rebuilt, and the heating and ventilating arrangements recast. The chancel is enriched with three figure subject windows in stained glass, and a fine organ is about to be erected by Messrs. Foster & Andrews, of Hull. The enlargement has been carried out by local tradesmen, at a cost of about 3,000*l.*

Wardington.—The parish church of Wardington has lately been re-opened, after restoration. The church, which is dedicated to St. Mary Magdalene, is of various dates. The chancel is of the early part of the fourteenth century, with a good east window of Early Decorated character. The windows on the north side are square-headed, but Early Decorated. The nave is of the thirteenth century, having five Early English arches on each side. These are small and low, quite plain, with simple, round pillars, excepting two on the south side, which are more ornamented, having clustered pillars and labels over them, but which are also Early English. The clearstory and roof are of the fifteenth century. The south aisle is a mixture of the styles of the thirteenth and fourteenth centuries. The tower is of the early part of the fifteenth century, and is of good, plain Perpendicular work. The font is of the octagonal cup form, with the date of 1566. The present work of restoration has been confined to the nave and the aisles, but the restoration of the chancel is stated to be in contemplation. The nave and aisles have been restored, and the under part of the tower up to the first stage. The church has been re-seated with pitch-pine seats, the backs of which at the entrance to the church are relieved with rich tracery panels. The bases of the pillars have been restored, and, like some other parts of the fabric, they were much in need of it. An old window has been opened in the south side of the church, and a new window put in in the north side. A single light has been opened up under the sanctus bell, and filled in with stained glass by Messrs. Heaton, Butler, & Bayne, of London. The light was completely hidden by plaster previously. The old screen on the south of the chancel has been restored. The floor in the seats has been re-laid with wooden blocks and an oak kerbing, and the aisles have been laid with Godwin's tile paving. A new stained-glass window has been put in on the north side of the church by Mr. James Sabin in memory of his wife. A new pulpit (prepared from the design of the architect) in oak, carved and moulded, has been erected, and is placed on a Hornton stone base. The organ has been removed from the arch under the tower, and placed in the north aisle. The building is heated by Porritt's stoves. Outside, the structure has been renewed and restored where necessary, and repointed. The roofs have been covered with cast lead, the old lead having been re-cast on the ground. The architect was Mr. Ewan Christian, of London, and the builder Mr. Charles Claridge, of Banbury. The cost of the restoration will be about 1,500*l.*

SCHOOL-BUILDING NEWS.

Ealing.—St. John's Schools, Ealing Dean, are about to be enlarged, the committee of the schools finding that accommodation for seventy or eighty more infants is absolutely necessary. Mr. Downs, of Uxbridge-road, Ealing, is the builder, and the extension will be carried out under the supervision of Mr. Robert Willey, architect.

Ilkeston.—It is intended to build new Primitive Methodist schools and class-rooms here forthwith at an outlay of 1,050*l.* There will be ten rooms in all, the class-rooms occupying the ground-floor, and school-room over. There will be accommodation for 500 scholars. The architect is Mr. John Wills, of Derby.

Salford.—A commodious school, which has been erected in Grecian-street, Lower Broughton, by the Salford School Board, was formally opened on the 9th ult. The building is a three-story one, and the fronts are built in brick-work, relieved by red terra cotta. On the ground-floor are the schools for the infants and junior children, and on the first-floor two schools for the senior boys and girls. On the second-floor are the chemical lecture-room, laboratory, and other rooms, so placed as to be accessible from both the boys' and girls' staircases; here also is the kitchen (where cookery will be taught), and a large room to be used either as an art studio or as a dining-room. Class-rooms cloak-rooms, and conveniences are provided for each department. All the large rooms are warmed and ventilated by means of Mr. E. H. Shorland's, patent "Manchester Warm Air Grates," and special arrangements have been provided for the inlet and extraction of air during the summer, when the grates will not be in use. The building has been erected by Messrs. W. Southern & Sons, the contract amount being 8,120*l.* The architect is Mr. Henry Lord, of John Dalton-street, Manchester.

Smethwick.—New schools situated at the Cape, Smethwick, which have been erected for the School Board, were recently formally opened by the Rev. J. H. Crump, M.A. (chairman of the School Board). The schools, which will accommodate about 890 children, are described by the *Wolverhampton Chronicle* as built in the Renaissance style, the material used being red bricks and terra cotta, with Broseley tiles. The schools consist of three departments,—boys', girls', and infants',—with a number of class-rooms, lavatories, &c., arranged with all recent improvements. The plans were prepared by Mr. George H. Cox, architect, Birmingham, and the work has been carried out by Mr. James Horley, of Smethwick.

St. Just, Cornwall.—The Wesleyan Society at the above place have decided to at once proceed with the erection of new schools and vestries, the tender of Messrs. R. H. Roberts & W. Marks having been accepted in the sum of 718*l.* 10*s.* They are to be erected from the designs and under the superintendence of Mr. Oliver Caldwell, architect, Penzance.

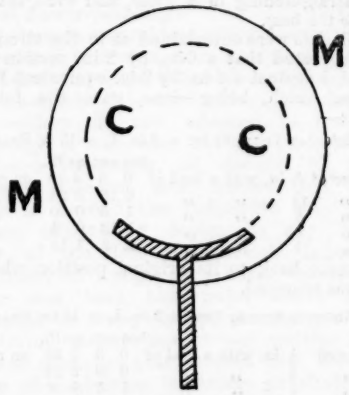
Wednesbury.—The new schools erected by the Wednesbury School Board at King's Hill, have lately been opened. The buildings have been erected by Mr. John Guest, of Brettell-lane, near Stourbridge, from designs prepared by Mr. Pincher, architect and surveyor, West Bromwich. They are in the Gothic style, and are faced with best red bricks of local manufacture, relieved with white Hollington stone dressings, and Broseley tiles for the roofs. A tower has been erected 80 ft. high. The schools consist of three departments, — boys', girls', and infants',—with a number of class-rooms, cloak-rooms, and lavatories, &c., arranged with all the latest improvements. Mr. John Neville, of London, provided the heating apparatus. The schools accommodate 733 children, at a total cost of 6,830*l.*, being equal to 9*l.* 6*s.* 4½*d.* per head.

The Student's Column.

IRON.

IX.—CAST IRON.

SOME very dry white sand is usually placed between the upper and lower boxes in the foundry, so as to prevent the rather moist red sand moulds in the top and bottom boxes from sticking together when laid one upon the other. The moulder holds in his left hand a calico bag, containing this fine dry sand, and by giving the bag a sharp knock with his right hand for a short time, he manages to spread a very thin layer of this sand, equally distributed over that surface of the mould in the bottom box which the top box touches. The moulder also has a bag containing what is termed "blacking," and this he distributes in the same manner over the surface which the melted iron will touch. This should be made of the very best charcoal, produced from oak, and made like very fine powder. Its object is to give a good face to the casting. A passage must also be left in the moulds to allow the air to escape, so as to prevent air bubbles. Holes in castings are made with "cores" formed of material more clayey than the moulds. Core boxes have often to be made in the pattern-shops. Bolt-holes are made in a casting by placing a cylindrical core in the mould, which is drawn out with the casting, and is then knocked out, leaving the hole the required size. Sometimes the holes have to be drilled. Cores are made of red sand mixed with a little clayey material, and kneaded together in a trough to destroy even the smallest lumps. When casting columns, the inner core is kept at a distance from the mould equal to the thickness of metal required by means of what the men term an iron "chaplet," usually of the shape shown in the figure, where C



represents the core, and M the line of the mould. The liquid metal is allowed to run in through a hole in the top box, at each end of the mould,—this is termed a "runner." Holes are also left in the top box of the mould called "risers," for the surplus metal to run out of, when sufficient has been poured in. The upper and lower boxes must be firmly connected together during the operation of casting, otherwise the force of the liquid metal would send the top box flying off into the shop. After a short interval the top box may be removed, and the casting allowed to cool. The casting is then taken out of the lower box, and sent to the fitting shop, where the odd pieces, runners, &c., of the casting are chiselled off; various parts filed and planed, holes drilled where required, and a face given to the casting by rubbing it over with smooth pieces of sandstone.

Iron becomes stronger to resist compression the more it is melted, but it also becomes more brittle, and it is therefore never melted more than three times. An iron bar will always contract towards the centre, which may be considered fixed. Each end in cooling approaches the centre, and thus shortens the bar. In designing any cast-iron railing or other large surface, care must be taken to distribute the metal equally as much as possible. To allow for cooling in the foundry, the wood pattern used in forming the mould is made one ninety-sixth (1-96th) larger than the casting, or 1 in. in 8 ft. This provides for the shrinking of the metal in cooling. Thus a figured dimension of 12 in. upon the drawing would become 12⅛ in. in the pattern, and the pattern for a casting 8 ft. long would be made 8 ft. 1 in. long.

Cast-iron frequently turns out unsound owing to various causes. The air may not all escape,

or pieces of sand may adhere to the iron, the sand may have been too moist, the metal may shrink internally, the iron may not be poured in hot enough, or the cores may get displaced, &c. When castings turn out failures they are called "wasters." Sometimes when there are holes upon the surface the workmen will put a kind of cement into them which resembles iron. The use of a filling called "beaumontique" by the workmen, is easily detected by employing a hammer to sound the casting upon delivery. The best castings are sometimes made in moulds "built up" with loam. If one side of a casting has more to bear than another, it should be placed lowermost in the mould. The iron, on entering the mould, divides into two currents, and on these meeting, if the iron is too cold to "weld," the flaw is called a "cold strut."

Sometimes it is necessary to provide the outside skin with the hardness of white iron, while the remainder retains the toughness of gray iron. This is effected by placing in the mould, over those parts where the surface is required to be hardened, pieces of cold iron of suitable shapes, thinly coated with loam. Where these are touched by the molten metal the surface is suddenly chilled. The screw-part of a screw-pile is a chilled casting, *i.e.*, the metal is allowed to run against an iron pattern well filled or planed, and thus rendered perfectly smooth, instead of running against the sand. If the casting be 4 in. thick, then will the outside be chilled, or be as hard as flint ¼ in. deep, and if the casting be 8 in. thick, then ½ in. will be chilled.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

1,784, Saw Sharpening and Setting. J. Griffin.

The apparatus which is the subject of this invention consists of a guide which runs along the edge of the saw. To this guide, or on a frame attached thereto, are small rollers, placed at a proper bevel or pitch, so as to guide the file in setting the teeth. A gauge for bending and a file for ranging the saws are also part of the appliance.

2,418, Improvements in Fire-grates, &c. H. S. Moorwood.

The essential feature of this invention is a combination and arrangement of parts and appliances by which the fire-bars or bottom grate may be raised or lowered. A quadrant rack acted upon by a worm wheel moves the grate into the position required.

4,039, Canopied Stove Grates. T. Watson and T. P. Moorwood.

The idea of this invention is that of employing louvre bars, ornamental in appearance, in such a way that they may be easily opened, closed, or quite detached for such purposes as may be required, such as ventilation, sweeping of the chimney, &c. They give when closed the appearance of an ordinary canopied stove.

13,828, Hollow Fireproof Partitions. G. Hamblett.

The slabs used by the patentee are formed with three cylindrical and conical holes running vertically through them, and at the end two half holes, wider at the lower than at the higher end, and placed equidistant from centre to centre. The slabs being placed with half or three-quarter covered joints the holes can be filled with a mixture of plaster and cement after the partition has been erected. The ends of the slabs are dovetailed, so that the slabs may be kept in place till the filling up of the holes and half-holes, which is the means of binding the whole partition together, has been effected.

15,008, Fireproof Composition. W. Brandt.

The subject of this patent is a composition in which soluble glass plays an important part, and borax or other fire-resisting salts are mixed to form a pasty compound. Articles treated with the solution or mixture are covered with a compact and indestructible layer, checking further burning and rendering the articles incombustible. Thus objects contiguous to a fire may be coated with the improved mixture and cannot burn, even if covered with tar, petroleum, or other inflammable material. The inventor concludes his specification with the statement "that the human body can also be coated with the improved mixture; for instance, a hand covered with the mixture can reach into the fire without injury."

17,483, Concrete Pavements. A. L. Barber.

The object of this invention is to thoroughly lock or cement the different layers or strata of which the pavement is composed, and to form a bond of union between the upper or wearing course and the intermediate or binding course, so that there will be less liability to crack and disintegrate under the influences of heat, cold, or moisture. Concrete is first laid down as the base of the pavement, then hydraulic cement and clean sharp sand with broken bricks or gravel is made into a kind of mortar and spread over the concrete bed. The upper surface is finished with a smooth surface and shaped to the crown of the road. Then a composition of stone dust and heated tar is laid over the top and ironed down with smoothing irons. Coal-tar cement is also used at the sides of the roadway to preserve the paving from the effects of moisture, &c.

NEW APPLICATIONS FOR PATENTS.

Feb. 17.—2,380, D. and R. Williamson, Warming or Ventilating Rooms, Buildings, &c.—2,385, H. Johnson, Ventilators.—2,386, H. Johnson, Exhaust Ventilator. — 2,393, G. Pickles, Wood-planing Machinery.—2,397, A. Tuck, Finger-plates for Doors.—2,410, R. Lowe, Combined Scullery Sink Pipe and Trap.

Feb. 18.—2,436, G. Brown, Material for Wall Decoration. — 2,455, F. Crane, Varnishes and Lacquers.

Feb. 20.—2,482, W. Bartholomew, Water-closets. —2,494, J. Ashforth, Bench Vices.—2,496, H. Johnson, Ventilators.—2,499, S. Bott and Others, Sash Fasteners.—2,531, A. Boult, Storm Doors.

Feb. 21.—2,544, A. and J. Greenwood, Warming and Ventilating Rooms.—2,570, L. Shedden, Laying Floors, &c., and Joining Planks of Wood.—2,596, A. Woodhouse, Sewer Ventilation, &c.—2,605, E. Dean, Apparatus for Cooling and Ventilating Apartments, Buildings, &c.

Feb. 22.—2,623, J. Deverill, jun., Disconnecting Gully Trap for Drains, &c. — 2,631, W. Bird, Attaching Lock-knobs to Spindles.—2,632, J. Roberton and J. Patrick, Portland Cement, &c.—2,641, W. Constable and J. Joseph, Artificial Stone. —2,650, E. Johnson, Cleaning Wall-papers, Papered Ceilings, &c.

Feb. 23.—2,691, E. Baldwin, Sash-fasteners.—2,708, A. Stevens, Securing Scaffolding.—2,711, J. Gowland, Regulating and Controlling the Draughts in Chimneys, &c. — 2,710, W. Burr, Preventing Window-sashes, &c., from Shaking and Rattling.—2,714, A. Pierce, Hoisting Apparatus.—2,731, W. Graham, Wood-cutting Bow Saw.

PROVISIONAL SPECIFICATIONS ACCEPTED.

381, H. Romain, Preventing Draughts to Doors in Rooms, Houses, &c.—740, J. Grosjean, Roofs.—741, H. Gear, Wood Laths used in Plastered Structures.—736, F. Buckland, Portable Conservatories, &c.—888, H. Waddington, Draught Preventers for Doors and Windows.—1046, W. Redish, Fire-grates.—1,373, J. Dittrich, Ventilating or Chimney Cowls.—1,425, W. Payne, Pivoting Fanlights, &c.—1764, R. Stanley, Ovens or Kilns for Burning Bricks, Tiles, &c.—1,804, W. Selous, Printing Wall-papers, &c.—1,862, J. Welch, Manufacture of Glass from Slate and Slate Waste.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

5,765, G. Thornborough and E. Larmour, Swivelling Sliding Doors or Partitions.—5,901, J. Doulton, Earthenware Blocks and Tiles.—10,281, Q. Backus, Stoves and Chimney-pieces in Combination. —17,736, T. Horn and J. Robson, Jointing Building Blocks, &c.—17,954, J. Worth, Cranes and Hoists. —22, C. Groombridge and J. Rickman, Bolt for Doors, Gates, &c.—816, W. Gedge, Ceilings and Walls, for the better Plastering thereof.—954, D. Hart, Screw-drivers.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEBRUARY 20.

By GEO. NEWMAN.

New Cross—199, New Cross Gate, 22 years, ground-rent 6*l.*	£420

FEBRUARY 21.

By P. HODSON.

Finsbury Park—63, Woodstock-road, 79 years, ground-rent 6*l.* 6s.	260

By C. & H. WHITE.

Kennington—13 and 14, Esher-street, copyhold	580
9 and 10, Esher-street, 16 years, ground-rent 9*l.*	285
Stockwell—Ground-rents of 16*l.*, reversion in 55 years, and a plot of freehold land	460

By J. MCLACHLAN & SONS.

Clapham Common—14, Aldersbrook-road, 89 years, ground-rent 8*l.*	425

By DEBENHAM, TEWSON, & Co.

Stratford—Ground-rents of 32*l.* 4s., reversion in 52 years	920
West Ham—Ground-rent of 19*l.* 10s., reversion in 71 years	500
Barking-road—Ground-rent of 25*l.* 10s., reversion in 88 years	570
Leyton—Ground-rent of 20*l.*, reversion in 77 years	440
Mile End—Ground-rent of 7*l.*, reversion in 29 years	240
Bromley-by-Bow—Ground-rent of 9*l.*, reversion in 85 years	220
Ground-rent of 21*l.*, reversion in 85 years	440
Deptford—Ground-rent of 16*l.* 10s., reversion in 70 years	380
Hackney-road—No. 124, freehold	830
Mile End—The British Caiman beerhouse, freehold	350
Stepney—20, Rhodeswell-road, freehold	430
Limehouse—51, 53, and 79, Maroon-street, freehold	930
Peckham—62 and 64, Commercial-road, freehold	620
Wanstead—1 and 4, Alexandra-terrace, freehold	1,800
Gravesend—5, Portland-villas, freehold	500
Barking-road—A plot of freehold land	£15
Tonbridge—Dry Hill, a plot of freehold land, 0a. 1r. 25p.	450
Bow-road—28 to 31, Coburn-street, 29 years, ground-rent 24*l.*	790
Walthamstow—The freehold residence, Wood End House, and 4a. 3r. 26p.	3,650

FEBRUARY 22.

By MOORE & TEMPLE.

Finsbury-square—14 and 16, Earl-street, freehold	2,230
35, Sun-street, 20 years, ground-rent 6*l.*	530

By CHADWICK & SONS.

The Screw Steam Launch, "Criterion," 8·52 tons	290
Lincoln's Inn-fields—No. 59, the lease of ground-floor, term 1 year	170

By HAMPTON & SONS.

Portland-place—No. 56, and stabling, 15 years, ground-rent 120*l.*	2,000
Clapham—59, Bromfelde-road, 74 years, ground-rent 9*l.* 9s.	530
Fulham—28 and 30, St. Maur-road, 91 years, ground-rent 10*l.*	715

FEBRUARY 23.

By BEADEL & CO.

Baldock, Herts—Kingswood Farm, and 569a. 3r. 21p., freehold	5,700

By A. STEARN.

Leytonstone—Queen's-road, freehold coach-house and stabling	225

By DYER, SON, & HILTON.

Lee—6A, Bromley-road, 76 years, ground-rent 7*l.* 10s.	400

By C. C. & T. MOORE.

Forest Gate—6, Pevensey-road, freehold	240
Barking—2 to 8, Britannia-cottages, freehold	400
59 and 61, Axe-street, freehold	320
Tanner-street, freehold cottage	250
24, Station-place, 60 years, ground-rent 6*l.*	125

By E. STIMSON.

Brixton—19, Santley-street, 87 years, ground-rent 8*l.* 8s.	420
New Cross-road—Ground-rents of 48*l.*, term 54 years	810
Kennington—12 and 13, Royal-terrace, 59 years, ground-rent 10*l.*	305
Peckham—211 to 221, odd, Cator-street, 28 years, ground-rent 5*l.*	540
9, Wadnor-street, 52 years ground-rent 3*l.*	240
Clapham—Ground-rent of 11*l.* 16s., term 51 years	215
Islington—Ground-rent of 6*l.*, term 57 years	125

By NEWBON & HARDING.

Forest Gate—27, Odessa-road, freehold	310
City-road—1, Gordon-street, 38 years, ground-rent 5*l.*	240
Notting Hill—Ground-rent of 36*l.*, term 50 years	610
Stoke Newington—139, Shakespeare-road, 71 years, ground-rent 5*l.*	225
Canonbury—50, Halton-road, 30 years, ground-rent 7*l.*	380
Finsbury Park—40, Ambler-road, 78 years, ground-rent 6*l.*	345
11, Plimsoll-road, 79 years, ground-rent, 5*l.*	295

FEBRUARY 24.

By FURBER, PRICE, & FURBER.

Mayfair—23, Queen-street, 850 years, ground-rent 5*l.* 11s.	2,990
Piccadilly, The Albany—A rental of 40*l.* a year	895
Dalston—4, St. Mark's-road, 69 years, ground-rent 7*l.*	400

By R. REID.

Regent's Park—36, York-terrace, 33 years, ground-rent 45*l.*	1,300
Marylebone—92, Great Titchfield-street, 20 years, ground-rent 25*l.*	605
Notting Hill—50 and 52, Queen's-road, 55 years, ground-rent, 12*l.*	645

By BAKER & SONS.

Piccadilly—60, Shaftesbury-avenue, freehold	2,320
Southwark—Ground-rent of 400*l.*, reversion in 76 years	9,850
Hendon, Mill Hill—A plot of freehold land	200

By MULLETT, BOOKER, & Co.

Hyde Park—1 to 12, Craven Hill-mews, 46 years, ground-rent 78*l.*	6,350

MEETINGS.

SATURDAY, MARCH 3.

Association of Public Sanitary Inspectors.—Mr. S. Fairchild on "Plumbers' Work in Dwelling Houses." 6 p.m.

MONDAY, MARCH 5.

Royal Institute of British Architects.—Special General Meeting, of Members only, to elect the Royal Gold Medallist, and to receive and consider the Preliminary Report on new By-laws. 8 p.m.

Surveyors' Institution.—Mr. W. Dundas Gardiner on "Points in the Law relating to Ancient Lights." 8 p.m.

Society of Engineers.—Mr. Henry Faija on "The Effect of Sea Water on Portland Cement." 7·30 p.m.

Clerks of Works' Association (Carpenters' Hall).—Monthly Meeting. 8 p.m.

Society of Arts (Cantor Lectures).—Mr. J. Mayall, jun., on "The Modern Microscope," II. 8 p.m.

Leeds and Yorkshire Architectural Society.—Paper by Mr. William Emerson. 7·30 p.m.

TUESDAY, MARCH 6.

Institution of Civil Engineers.—Further discussion on Mr. R. A. Hadfield's papers on "Manganese in its Application to Metallurgy," and "Some Novel Properties of Iron and Manganese." 8 p.m.

Society of Arts (Foreign and Colonial Section).—Mr. W. H. Penning, F.G.S., on "South African Goldfields." 8 p.m.

Museum of Archæology, Cambridge.—The Rev. G. F. Browne, B.D. (Disney Professor), on "Sculptured Stones of pre-Norman Type in the British Islands," VI. 2·30 p.m.

Manchester Architectural Association.—Election of Officers. 7·30 p.m.

WEDNESDAY, MARCH 7.

British Archæological Association.—Mr. Thos. Morgan on "Early Romano and Late Excavations in the Forum of Rome. 8 p.m.

Society of Arts.—Mr. W. T. Rowlett on "Framework Knitting." 8 p.m.

Liverpool Engineering Society.—Mr. J. H. T. Turner, on "Filtration of Sewage." 8 p.m.

THURSDAY, MARCH 8.

Society of Telegraph-Engineers and Electricians.—Mr. R. von Fischer Treuenfeld on "The Present State of Fire Telegraphy." 8 p.m.

Society of Antiquaries.—8·30 p.m.

Edinburgh Architectural Association.—Mr. W. P. Buchan on "The Ventilation of Churches, Schools, and other Buildings." 8 p.m.

FRIDAY, MARCH 9.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Chatterton on "The Prevention and Extinction of Fires." 7·30 p.m.

Miscellanea.

A New Hot-Air Engine.—Some particulars of Benier's hot-air engine are contained in the recently-published volume of the Proceedings of the Institution of Civil Engineers. The mode of heating air for hot-air engines may be placed in three classes:—1. Those engines in which the air is heated in a separate reservoir, cold air being pumped into it. 2. Those in which the air is heated in a separate reservoir, passing through the combustible within the reservoir. 3. Those in which the air is heated within the working cylinder by means of a furnace outside. All these systems are open to various objections. In the first a high temperature cannot be attained without soon damaging the walls of the reservoir. In the second, though the heat is better utilised, slide valves are overheated and quickly put out of order. In the third the heat is utilised only to a limited extent, the slide-valves becoming over-heated. The motor of Messrs. Benier Bros. constitutes a fourth combination, and, it is claimed, is free from the objections referred to. The air is heated within the cylinder by means of a furnace also within the cylinder. All the heat of combustion is directly utilised, and the valves are only traversed by cold air. The heated air acts directly as it expands on the piston, and the cold air delivered into the piston and the cylinder prevents the encroachment of coke particles. The supply of air for combustion is regulated by the governor. A description of this motor appeared in *L'Industrie Moderne*, 1887, p. 13. It appears, in some respects, to resemble a caloric engine recently brought out by a firm of Liverpool engineers. Trials have been made of the Benier engine, and the following results as to consumption of fuel are quoted in our foreign contemporary. For motors of 4 horse-power the consumption of coke was 3·3 lb. per H.P. per hour, and for motors of 2 horse-power the consumption was 4 lb. of coke per H.P. per hour. These results appear very good indeed, but it would be satisfactory to know what "H. P." stands for. If it means the power available for use, or effective horse-power (E.H.P.), the inventors are to be congratulated, but if it means the power as calculated from the indicator card (I.H.P.), then a heavy discount will have to be allowed for the energy absorbed in working the air-pump.

Asphalte Roofs.—We have had an opportunity of inspecting a very admirable new flat asphalte roof at the Army and Navy Stores, Howick-place, Victoria-street, Westminster, laid by Claridge's Patent Asphalte Company. It has a superficial area of 5,000 ft., and the material is ¾ in. thick. It is of the Company's particular quality of asphalte, and has been laid in a very workmanlike manner, showing that great care and labour have been bestowed upon it and upon the necessary skirtings and fillets. We have on several occasions spoken in commendation of roofs laid by this company. Among them we recollect a larger roof laid by them a few years since at an adjoining building occupied by the same Stores, with an area of about 10,000 ft. super. We may mention that this year the Claridge Company (of which Mr. J. Farrell is the well-known secretary) has reached its jubilee. The general contractors for the work now noticed are Messrs. G. H. & A. Bywaters, of Regent-street, Mr. John Bull, of Craven-street, being the architect.

Honor Oak.—On the 16th ult. the new Baptist School Chapel, Honor Oak, was opened for public worship. The building consists of a school chapel 61 ft. 6 in. by 32 ft. 6 in. inside, having a partly open-timbered roof, ceiled at a height of 25 ft.; inner and outer front lobbies, all doors opening outwards; and a vestry, 10 ft. by 12 ft., &c. The style is Early Gothic, and the materials used are red brick with Bath stone dressings and slated roofs. The contract for the chapel was taken at 1,093*l.* by Messrs. F. & H. F. Higgs, Loughborough Junction, S.E. The architect was Mr. Geo. Baines.

London Sanitary Protection Association.—The seventh annual meeting of this Association was held on Saturday last, the 25th of February, at the rooms of the Society of Arts, Adelphi, Lord Chelmsford in the chair. The report of the Council showed an increase of members over last year of 108; 456 new members having joined, and 348 having left, the majority of the latter being persons who had joined for a special purpose, viz., the inspection of a house or premises which they were about either to take or let. The number of inspections made during the year also showed an increase, the total being 1,488, including 451 first inspections and 602 annual. It was somewhat remarkable that the condition of the houses inspected for the first time showed a lower average than usual, the percentage of bad (including rather bad and very bad) being 65, whereas on the average of the preceding six years that percentage was only 56. The report also alluded to the death of the late secretary, Mr. Cosmo Innes, who had worked very zealously for the Association from its foundation, and to the appointment as his successor of Mr. Wm. Smith, M. Inst. C.E. The Treasurer's report showed a small balance of income over expenditure, and stated that this could never be much exceeded, the object of the Association being to do the work of inspection in the most thorough and efficient manner, and to charge only such fees as would cover the cost. Mr. Timothy Holmes (Hon. Treasurer), in presenting the above report, stated that the progress made during the present year had been greater than on any previous occasion. Mr. E. C. Robins pointed out that the Association had done good work for the public as well as for its own members, in spreading sound knowledge on sanitary matters, and remarked on the fact that large houses were often more defective than small ones, bishop's palaces being some of the worst which had come under their notice. The report was adopted.

The Late Mr. George Godwin.—Probate of the will, dated the 1st of November, 1881, of George Godwin, F.R.S., F.S.A., late of 6, Cromwell-place, who died on the 27th ult., aged 73 years, and who was Editor of the *Builder* from 1844 to 1883, has been granted to the executors, his brothers, Major Henry and Dr. Ashton Godwin, to each of whom and to his brother Sidney Godwin he bequeaths 150*l.*; to the Royal Literary Fund, 200*l.*; the Newspaper Press Fund, Artists' Benevolent Fund, Artists' General Benevolent Institution, and Architects' Benevolent Society, each 100*l.*; to his nephews Harold and Arthur Godwin each 300*l.*; his godson George Godwin and his goddaughter, Edith Verity, each 100*l.*; his nephews and nieces, Garth, Ernest, Maude, Hilda, and Cedric Godwin, each 200*l.*; to his housekeeper, 50*l.* and a life annuity of 60*l.*; and to his three brothers above-named, his plate, pictures, books, articles, and effects. All the residue of his property, including his freehold houses and ground-rents, Government securities and bonds (the personality being of the value of 78,986*l.* 12s. 8d.) the testator devises and bequeaths for division in equal shares among his brothers Richard, Sidney, Henry, and Ashton Godwin and his sisters Miss Marian Godwin and Mrs. Elizabeth Verity, his brother Frederick being already sufficiently provided for.

London and Middlesex Archæological Society.—By the permission of the knights and officers of the Order of St. John of Jerusalem (English Langue), a meeting of the members and friends of the above society was held at St. John's Gate, Clerkenwell, on Thursday, February 23rd. Dr. Edwin Freshfield V.P.S.A., presided, and read a paper on "Some observations of St. John's Gate and its Associations," giving a history of the order of the Knights of St. John, from their foundation, and a description of the architecture of St. John's Gate and Priory. The next meeting of the society is to be held in May, at the Hall of the Fishmongers' Company, permission having been granted by that Company for the purpose.

Competition: Doncaster Free Library and School of Art.—We are informed by the Town Clerk that there were fifty-five designs, &c., sent in for this building. The first premium has been awarded to Mr. H. A. Cheers, of Twickenham, and the second premium to Messrs. Henman & Timmins, of Birmingham.

The South Metropolitan Gas Company's New Works at Greenwich.—For some time past the South Metropolitan Gas Company have had in course of construction very extensive and costly new works at Greenwich, which, when fully completed, will be among the largest of any similar works in the neighbourhood of the metropolis. For the purposes of the undertaking the company have had to purchase 130 acres of land, but a portion of this is intended to be reserved for possible future requirements, the works now in progress covering an area of 90 acres. The site of the works is at East Greenwich, situated on a tongue of land opposite Blackwall, known as Greenwich Marshes. The preliminary works involved a considerable amount of engineering and labour, the level of the land being from 8 ft. to 10 ft. below high-water mark, and a solid foundation for heavy buildings and apparatus could only be found at a depth of 20 ft. below the surface, which has added largely to the cost of construction. On this large site of 90 acres gasworks for the manufacture of an additional 60 million cubic feet per day, or considerably more than double the present maximum make, have been planned and designed, and are being erected in sections parallel to the river and to each other. There are twelve of these sections, the first of them having recently been completed, and the works in connexion with it started. Each section is to be a complete plant, with 450 retorts for the manufacture of a maximum quantity of five million feet of gas a day. The first section consists of a retort-house, 490 ft. long by 70 ft. wide, flanked by two coal stores running the entire length. An engine-house to serve for four retort-houses has been erected, and fitted with engines and exhausters. Adjoining are the washers and scrubbers; a set of six large purifiers, each of 2,000 ft. area; and again adjoining the station-meters for measuring the gas made before it enters the gasholder. This gasholder, which will have a capacity of eight million cubic feet, is at present in course of construction. In addition to the gas-making plant other expensive works have already been carried out, including a river wall, of which a length of 1,000 ft. has been completed, and 500 ft. more are in course of construction; also a jetty for unloading coals, and an elevated railway to convey them to the stores. The works have been designed by Mr. Frank Livesey, the company's chief engineer, and when finally completed are estimated to cost upwards of 250,000*l.*

New English Art Club.—The Spring exhibition of this Club will be held at the Dudley Gallery. The selecting jury and hanging committee of this Society are elected on the principles of the suffrage by and from the members and exhibitors of the previous year, and all works, even those of the members, are submitted to this jury, thus insuring fairness to all and no "privileges."

The Parkes Museum.—The Worshipful Company of Grocers have just made a donation of 20*l.* to this Museum to aid in its work of practical teaching and demonstrating sanitary science.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. .....ton	6	10	0	7	15	0
Teak, E.I. .....load	8	0	0	12	10	0
Sequoia, U.S. .....foot cube	0	2	3	0	3	0
Ash, Canada .....load	3	0	0	4	10	0
Birch ,, ...	2	0	0	3	10	0
Elm ,, ...	3	10	0	4	10	0
Fir, Dantsic, &c.	1	10	0	4	0	0
Oak ,, ...	2	10	0	4	10	0
Canada	3	0	0	6	0	0
Pine, Canada red	2	0	0	3	10	0
,, yellow	2	0	0	4	0	0
Lath, Dantsic .....fathom	3	0	0	5	0	0
St. Petersburg	4	0	0	5	10	0
Wainscot, Riga .....log	0	0	0	0	0	0
,, Odessa, crown.....	2	10	0	3	0	0
Deals, Finland, 2nd and 1st...std.100	7	10	0	9	0	0
,, 4th and 3rd	6	0	0	8	0	0
Riga	5	10	0	7	10	0
St. Petersburg, 1st yellow	8	10	0	14	0	0
,, 2nd ,, ...	7	0	0	8	0	0
,, white	6	10	0	8	10	0
Swedish	6	15	0	15	0	0
White Sea	7	0	0	16	10	0
Canada, Pine, 1st	16	0	0	24	0	0
,, ,, 2nd.....	10	0	0	15	10	0
,, ,, 3rd, &c.....	7	0	0	9	10	0
,, Spruce, 1st	8	0	0	9	10	0
,, ,, 3rd and 2nd.....	5	0	0	7	0	0
New Brunswick, &c.....	5	0	0	7	0	0
Battens, all kinds	4	0	0	10	10	0
Flooring Boards, sq., 1 in., prepared, First	0	8	0	0	11	6
Second	0	6	6	0	7	6
Other qualities	0	4	0	0	6	0

TIMBER (*continued*).	£. s. d.	£. s. d.
Cedar, Cuba ....foot	0 0 3½	0 0 3½
Honduras, &c.	0 0 3	0 0 3½
Australian	0 0 2	0 0 3
Mahogany, Cuba	0 0 4½	0 0 7
St. Domingo, cargo average	0 0 4½	0 0 6
Mexican ,, ...	0 0 3½	0 0 3½
Tobasco ,, ...	0 0 4	0 0 5
Honduras ,, ...	0 0 4	0 0 5
Maple, Bird's-eye	0 0 5	0 0 7
Rose, Rio ....ton	8 0 0	11 0 0
Bahia....	7 0 0	9 0 0
Box, Turkey	5 0 0	12 0 0
Satin, St. Domingo ....foot	0 0 5	0 0 9
Porto Rico	0 0 6	0 0 10
Walnut, Italian	0 0 4	0 0 5½
METALS.		
IRON—Bar, Welsh, in London...ton	0 0 0	0 0 0
,, ,, in Wales	0 0 0	0 0 0
,, ,, Staffordshire, London	0 0 0	0 0 0
COPPER—		
British, cake and ingot ....ton	77 0 0	78 0 0
Best selected	78 0 0	79 0 0
Sheets, strong....	90 0 0	0 0 0
Chili, bars	79 5 0	0 0 0
YELLOW METAL....lb.	0 0 7½	0 0 7½

METALS (*continued*).	£. s. d.	£. s. d.
LEAD—		
Pig, Spanish ....ton	14 15 0	0 0 0
English, common brands....	15 0 0	0 0 0
Sheet, English	16 0 0	16 5 0
SPELTER—		
Silesian, special ....ton	19 10 0	19 15 0
Ordinary brands....	19 5 0	19 10 0
TIN—		
Straits....ton	166 10 0	0 0 0
Australian	166 10 0	0 0 0
English ingots	160 0 0	0 0 0
OILS.		
Linseed ....ton	18 12 6	18 15 0
Cocoanut, Cochin	28 0 0	0 0 0
Ceylon	24 15 6	0 0 0
Palm, Lagos	21 10 0	22 0 0
Rapeseed, English pale	24 0 0	0 0 0
,, brown	22 10 0	0 0 0
Cottonseed, refined	20 0 0	20 5 0
Tallow and Oleine....	25 0 0	45 0 0
Lubricating, U.S.	5 0 0	6 0 0
,, refined....	5 0 0	12 0 0
TURPENTINE—		
American, in casks ....cwt.	1 8 6	0 0 0
TAR—		
Stockholm ....barrel	0 15 0	0 15 6
Archangel	0 10 0	0 10 6

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Enlargement of the Guildhall	Cambridge Cor.	50 guineas	May 12th	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Firewood	Chelsea Guardians	*Official*	March 6th	x.
Repairing Carriage Road....	Met. Board of Works...	do.	do.	ii.
Annual Contracts	Lewisham Bd. of Works	do.	do.	ii.
Reconstruction of Bridge	Justices of the Peace, Parts of Holland (Lin.)	do.	March 7th	ii.
Fixtures, Fittings, &c.	Lambeth Guardians....	T. W. Aldwinckle....	do.	ii.
Alterations and Repairs	Wandsworth, &c., Un.	do.	March 8th	x.
Chocolate Cases	Admiralty	*Official*	do.	ii.
Road Materials	Tonbridge Highway Bd.	do.	March 10th	ii.
Annual Contracts	St. Giles's Brd. of Wks	G. Wallace	March 12th	x.
Lamp Columns	Willesden Local Board	O. Claude Robson....	March 13th	ii.
Works and Materials	Rotherhithe Vestry....	*Official*	do.	xi.
Forage, Road Materials, and Repairing Pipes	Tottenhm Local Board...	do.	do.	ii.
Pipe-Sewer	do.	do.	do.	ii.
Wrought-Iron Water Race	do.	do.	do.	ii.
Pumping Machinery....	West Cowes Local Brd.	do.	do.	x.
Enlargement of Euston Station	L. & N. W. Rail. Co....	do.	March 14th	x.
Sewerage and Sewage Disposal Works	Beverley Town Council	Brundell & Co....	March 17th	ii.
Repair of Private Roads	Croydon Cor....	*Official*	March 20th	x.
Making-up Roads, &c.	Richmnd (Surrey) U.S.A	W. Brook	March 22nd	x.
Broken Granite and Flints	Mortlake Highway Brd.	J. Medworth....	do.	ii.
Team Labour	do.	do.	do.	ii.
Tar Pavement....	do.	do.	do.	ii.
Tunnelling, &c., Works	Liverpool Corporation...	G. F. Deacon....	March 26th	x.
Cast-Iron Fencing	Margate Town Council	A. Latham....	Not stated...	x.
New Cavalry Barracks, Dublin....	War Department....	*Official*	do.	ii.
Blinds, &c., for Schools	School Brd. for London	do.	do.	x.
Factory....	W. Raymond & Sons ...	J. N. Johnston	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page
Clerk of Works	Stockton-on-Tees Cor....	3*l.* 3*s.* per week.....	March 13th	xvi.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

BLACKHEATH.—For alterations and repairs to Nos. 5 and 6, South-row, for Mr. A. Cator. Mr. R. W. Collier, architect, 30, Lincoln's Inn-fields:—

H. J. Williams	£1,583 0 0
W. T. Gates	1,409 10 0
G. F. Havell	1,330 0 0
E. Blow	1,265 0 0
W. Read	1,197 0 0
S. J. Jerrard	1,193 0 0

CHISWICK.—For the erection of a new boathouse at Chiswick. Mr. Spencer Chadwick, architect, 17, Parliament-street, S.W.:—

E. C. Howell & Son	£1,884 0 0
J. T. Chappell	1,428 0 0
Alex. Adams & Son	1,372 0 0
J. H. Adamson & Son	1,279 0 0
R. Arundell & Son	1,219 0 0
Bird	1,040 0 0

COLCHESTER.—For the extension of the Eagle Brewery, Colchester, for the Colchester Brewery Co., Limited. Messrs. H. Stopes & Co., architects and surveyors, 24A, Southwark-street, E.C.:—

A. Coe, Ipswich	£3,950 0 0
W. A. Chambers, Colchester	3,739 0 0
A. Diss, Colchester	3,700 0 0
H. Everett & Son, Colchester	3,539 0 0
G. Dobson, Colchester	3,475 0 0
F. Dupont, Colchester (accepted)	3,375 0 0

CROXLEY GREEN.—For the erection of a dwelling-house and stabling in New-road, Croxley Green, for Mr. W. Valler. Mr. N. Harry Heron, architect, Uxbridge:—

Wilson, Croxley Green (accepted)	£500 0 0

[No competition.]

DEPTFORD.—For alterations and additions to the Duke public-house, Creek-road, Deptford, for Mr. A. German. Messrs. Furniss & Thorpe, architects, 60, Kentish Town-road:—

Gould & Brand	£469 0 0
Toms	442 0 0
J. Anley	440 0 0
Jerrard	394 0 0
J. Beale, Westminster Bridge-road*	393 0 0

* Accepted.

EAST GRINSTEAD.—For the erection of a Jubilee Memorial Institute at East Grinstead. Mr. Paul B. Chambers, architect:—

W. Gray, Reigate	£1,250 0 0
C. Rice, East Grinstead	1,213 0 0
J. Morris, East Grinstead	1,090 0 0
W. Pledge, East Grinstead	1,014 0 0
Charlwood Bros., East Grinstead	944 0 0
A. Foster, East Grinstead	880 0 0

EAST HAM.—For new roads and sewers on the Plashet Hall Estate, East Ham, for the Trustees of the late Mr. J. Gurney. Messrs. Philip D. Tuckett & Co., surveyors:—

John Jackson	£718 0 0
Henry Potter	688 0 0
Joseph Jackson	679 17 6
George Dickens	658 0 0
Charles Killingback	654 0 0
E. Rogers & Co.	649 0 0
Eli Wilson (accepted)	583 0 0

GRIMSBURY.—For the erection of two houses, Merton-street, for Mr. J. Smith. Mr. H. Hopkins, surveyor:—

G. Willis, Grimsbury	£498 0 0
J. Grant, Grimsbury	459 0 0
Thos. Page, Grimsbury	405 0 0
E. Jarvis, Banbury	376 0 0

HILLINGDON—For additions to the sexton's lodge, Uxbridge Cemetery, for the Burial Board, Mr. N. Harry Heron, architect, Uxbridge:—

Briant, Uxbridge	£175 0 0
Hardy, Cowley	144 0 0
Wilson, Uxbridge (accepted)	115 0 0

HOWTH (Co. Dublin).—For the erection of villa-residences at Howth, Co. Dublin, for the Rev. R. S. Kerr. Mr. W. Kaye Parry, M.A., architect, 42, Dame-street, Dublin. Quantities by Mr. H. McConnell, Dublin:—

	One House.	Two Houses.	Three Houses.
T. & J. Pemberton	£940 0 0	£1,840 0 0	£2,700 0 0
Wardrop	846 16 0	1,666 0 0	2,485 0 0
Kieman	833 0 0	1,620 0 0	2,400 0 0
Dalton	828 10 0	1,641 15 0	2,451 15 0
J. Pemberton	794 0 0	1,588 0 0	2,372 0 0
Pile	790 0 0	1,550 0 0	2,280 0 0
Brien	770 0 0	1,500 0 0	2,256 0 0
Breslau	750 0 0	1,475 0 0	2,200 0 0
Moloney	742 3 7	1,422 0 0	2,144 0 0

LEE-ON-THE-SOLENT (Hants).—For the erection of toll-house, &c. (exclusive of ironwork), for the Lee-on-the-Solent Pier Company, Limited. Mr. Horace A. Alexander, architect, 72, Cannon-street, E.C.:—

Wareham, Titchfield (accepted)	£334 0 0

LONDON.—For the erection of the Portland Industrial Dwellings, Marylebone. Mr. Charles Fowler and Mr. A. B. Pite, joint architects. Quantities by Mr. Henry Lovegrove, F.S.I., 26, Budge-row, E.C.:—

Higgs & Hill	£16,690 0 0
Faulkner	15,969 0 0
Lathey Bros.	15,760 0 0
Staines & Son	15,688 0 0
J. Simpson & Son	15,555 0 0
Colls & Co.	14,970 0 0
Morter	14,900 0 0
Boyce	14,748 0 0
Patman & Fotheringham	14,315 0 0
Stimpson & Co.	14,170 0 0
Wall Bros. (accepted)	13,743 0 0

LONDON—For alterations and additions, High-street, Shoreditch. Mr. Geo. Edwards, F.R.I.B.A., architect. Quantities by Mr. H. Lovegrove, F.S.I., 26, Budge-row, E.C.:—

Killingback	£4,200 0 0
Rayner	3,995 0 0
Shepherd	3,989 0 0
Stimpson & Co.	3,800 0 0
Barnett	3,736 0 0
Martin, Wells & Co.	3,700 0 0
Brass & Co.	3,693 0 0
Boon	3,639 0 0
Wall	3,550 0 0
Scharien & Co.	3,492 0 0
Ward & Lamble	3,323 0 0
Green & Lee (accepted)	3,255 0 0

LONDON.—For two houses with shops on the Barnard Estate, Bethnal Green. Messrs. T. & W. Stone, 2, Great Winchester-street, E.C., architects:—

Higgs	£1,275 0 0
Jarvis	1,095 0 0
Thomerson	1,075 0 0
Beale (accepted)	1,015 0 0

LONDON.—For partly pulling down and rebuilding an addition to a leather factory, Juniper-street, Shadwell, E., for Messrs. S. E. Norris & Co. Mr. Charles Dunch, architect. Quantities by Mr. James F. Wesley, 277, Romford-road, Forest Gate, E.:—

Colls & Sons	£2,406 0 0
Mowlem & Co.	2,237 0 0
J. & J. Greenwood	2,221 0 0
Watson	2,200 0 0
Grover & Son	2,171 0 0
Atherton & Latta	2,050 0 0
Morter	1,990 0 0
Shurmur	1,989 0 0
Gentry	1,987 0 0
Harris & Wardrop	1,960 0 0
Nightingale	1,955 0 0
Ashby & Horner	1,930 0 0

LONDON.—For improvements at the Castle Tavern, Quaker-street, Spitalfields. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.:—

Contractor.

Bartram	£111 5 0

Pewterer.

Heath	69 15 0

Gas Fitter.

Steadman	22 0 0

LONDON.—For improvements at the Prince of Wales Tavern, Weymouth-street, Portland-place. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street Within, E.C.:—

Goodall	£225 0 0
Ivory	225 0 0
Walesby	217 0 0
Steel Bros.	215 0 0
Spencer & Co.	210 0 0

LONDON.—For supplying boundary railings, lectern, and font to St. Mary's Church, St. Mary's-road, Peckham. Mr. R. A. Lewcock, 88, Bishopsgate-street Within, E.C., and Mr. F. Grierson, joint architects:—

Jones & Willis (accepted)	£197 15 0

LONDON.—For alterations and repairs to Carlisle Chapel, Kennington-lane, S.E., for the "Salvation Army." Mr. E. J. Sherwood, architect, 101, Queen Victoria-street, E.C.:—

Wood, Harris, & Co., Rural-grove, Clapham-road	£650 0 0
W. & H. Castle, Redcross-street, Borough	626 0 0
C. Blyton, 102, Upper Kennington-lane	529 0 0
Alderton & Wheeler, Cambridge	481 0 0
Coxhead, Leytonstone (accepted)	331 0 0
Andrews & Roberts, Kennington Park	330 0 0

LONDON.—For gasfittings for Avenue Hotel, Shaftesbury-avenue, W.C.:—

Sugg & Co.	£283	10	0
Koaling, Teat, & Co.	214	9	0
Buckley & Beach	156	0	0
W. Winn (accepted)	140	0	0

LOUGHLINSTOWEL (Co. Dublin).—For drainage works, Loughlinstowel Workhouse, Co. Dublin, for the Guardians of Rathdown Union. Mr. W. Kaye Parry, M.I.C.E.I., engineer, 42, Dame-street, Dublin. Quantities by Mr. T. C. Autisell, Dublin:—

Mayers	£4,500	0	0
Cunningham	4,467	0	0
Wardrop	3,761	12	0
Pemberton	3,599	0	0
Pile	3,300	0	0
Baird	3,293	0	0
Dixon	3,159	5	9
Murphy	3,000	0	0
Brady	2,835	0	0
Breslau	2,660	12	0
Pluck (accepted)	2,662	10	0

ONGAR (Essex).—For the erection of new parish church, St. Peter's, Ongar, Essex. Messrs. William G. Habershon & Fawckner, architects, 38, Bloomsbury-square:—

Maides & Harper, Croydon	£2,996	0	0
Noble, Ongar	2,650	0	0
Haynes, Alperton	2,499	0	0
Bentley, Waltham Cross	2,452	0	0
D. C. Jones & Co., Gloucester	2,395	0	0
Peters, Horsham	2,293	0	0
Gregar, Stratford	2,267	0	0

OXFORD.—For the erection of a Temperance Hotel, Queen-street, Oxford. Mr. Fred. W. Albury, architect, Reading:—

T. H. Kingerlee (accepted)	£4,200	0	0

PADDINGTON.—For alterations and additions to stables, Kent-place, North Wharf-road, for Mr. John Howe. Mr. Wm. Hunt, architect, 18, Adam-street, Adelphi:—

Marks	£727	0	0
Freeman	665	0	0
Long	530	0	0
Toms	521	0	0
Parker	520	0	0
Evans	510	0	0
Haynes	450	0	0
Turtle & Appleton	447	0	0
Knight, Fulham (accepted)	425	0	0
D. F. Saunders, Shepherd's Bush	416	0	0
Arundell & Co. (too late).			

READING.—For the erection of four shops and premises, Cross-street, Reading, for Mr. W. I. Palmer. Mr. Fred. W. Albury, architect, Reading:—

Higgs & Sons	£2,650	0	0
J. C. Cook	2,530	0	0
J. Bottrill	2,475	0	0
G. Searle	2,415	0	0
W. H. Simonds	2,370	0	0
F. Newberry	2,250	0	0
W. Goodchild (accepted)	2,186	5	0

READING.—For the erection of two shops and premises, Blagrave-street, Reading, for Mr. W. J. Tee. Mr. Fred. W. Albury, architect, Reading:—

W. H. Simonds	£1,987	0	0
T. H. Kingerlee	1,985	0	0
Higgs & Sons	1,980	0	0
S. Denton	1,953	0	0
G. Wernham	1,880	0	0
W. Goodchild (accepted)	1,662	6	0

READING.—For the erection of shop, offices, and stores at the corner of Blagrave-street and Station-road, Reading, for Mr. Walter Parsons. Mr. Fred. W. Albury, architect, Reading:—

A. W. Dodd	£3,980	0	0
Higgs & Sons	2,684	0	0
G. Wernham	2,595	0	0
J. Bottrill	2,585	0	0
S. East	3,550	0	0
G. Searle	2,550	0	0
T. H. Kingerlee	2,459	0	0
W. H. Simonds (accepted)	2,444	0	0

READING.—For the erection of two shops and premises, St. Mary's Butts, Reading, for Mr. J. Powell. Mr. Fred. W. Albury, architect, Reading:—

G. S. Lewis	£2,286	10	0
W. H. Simonds	2,088	0	0
G. Wernham	2,063	0	0
J. Bottrill	2,050	0	0
S. Denton	1,999	0	0
S. East	1,959	0	0

ROTHERHITHE.—For the erection of warehouse, Rotherhithe. Mr. J. Jones, architect:—

Toms	£1,687	0	0
Rudd	1,658	0	0
Hunt (accepted)	1,630	0	0

TILEHURST.—For the erection of seven cottages at Tilehurst, Reading, for Mr. Joseph Marshall. Mr. Fred. W. Albury, architect, Reading:—

Ruffell Bros.	£1,450	0	0
F. Newberry (accepted)	1,250	0	0

TOTTENHAM.—For making-up Stonebridge-road, for the Tottenham Local Board of Health:—

Hindle & Morrish, Limited, London	£1,053	1	0
James Pizzey, Hornsey	985	5	2
John Mowlem & Co., London	985	0	0
W. Nichols, Wood Green	932	0	0
G. Bell, Tottenham	912	0	0
P. O. Jackson, Enfield	910	0	0
J. Bloomfield, Tottenham	889	16	9
Bradshaw & Co., 52, Queen Victoria-street, London, E.C. (accepted)	873	5	2½
Williamson, Potteries, Green-lanes	843	0	0

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